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VOLUME XLIII

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CONTENTS

PAGE

Notes on the Relation of Temperature, Hydrogen-ion concentration and Oxygen, to the Migration of Adult Sockeye Salmon. By R. E. Foerster, Ph.D..... 1
Semi-Precious Labradorite in Canada. By J. B. Mawdsley..... 4
Is It Right to Protect the Female of the Species at the Cost of the Male? By Otto Schierbeck 6
Notes on a Colony of Glaucous-winged Gulls in the Gulf of Georgia, B.C. By Theed Pearse 9
Contribution to the Knowledge of the Avifauna of North-Eastern Labrador. By Bernhard Hantzsch..... 11
Report of Council for 1928..... 18
Statement of the Financial Standing of The Ottawa Field-Naturalists' Club at the Close of the Year 1927-1928..... 19
Statement Reserve Fund Committee..... 20
Notes and Observations:—
A Visit to Flowerpot Island. By W. E. Saunders..... 20
Mourning Doves. By Manly F. Miner..... 20
A Large Flock of Starlings. By Jas. L. Baillie, Jr..... 21
Note on the Cerulean Warbler. By C. L. Broley..... 21
Wasps Occupy a House Wren Box. By (Miss) Lulu Kealy..... 21
Book Reviews:—
Vertebrate Zoology. By A. Willey..... 21
Scientific Natural History. By J.R.D..... 22

The official publications of THE OTTAWA FIELD-NATURALISTS' CLUB have been issued since 1879. The first were *The Transactions of the Ottawa Field-Naturalists' Club*, 1879-1886, two volumes; the next, *The Ottawa Naturalist*, 1886-1919, thirty-two volumes; and these have been continued by *The Canadian Field-Naturalist* to date. *The Canadian Field-Naturalist* is issued monthly, except for the months of June, July, and August. Its scope is the publication of the results of original research in all departments of Natural History.

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NOTES ON THE RELATION OF TEMPERATURE, HYDROGEN-ION CONCENTRATION AND OXYGEN, TO THE MIGRATION OF ADULT SOCKEYE SALMON

By R. E. FOERSTER, Ph.D.

Biological Board of Canada

THE STUDY of the migration of adult salmon from the marine feeding banks to their spawning beds continues to prove a most intriguing problem. Many able investigators have given attention to the phenomenon and have approached the problem from various angles but it is safe to say that up to the present no theory has been promulgated which satisfactorily fulfills all conditions.

It is generally conceded that the impulse to migrate originates in the reproductive organs, the evidence being that no migrants are found with undeveloped gonads. That the stimulus activating the reproductive organs has its origin in the changing length of day, photoperiodism, has been recently advanced by Rowan (1926), following upon his study of the migration of birds. It is a happy coincidence, at least, that the migration of salmon occurs at that time of year when the length of day is steadily increasing but it so happens that the migration is still in progress when the length of day is waning. Furthermore there are many fishes that migrate in the early spring, rather than the fall, in cases where a converse action of length of day would have to apply.

Whatever is the activating impulse, the conditions governing the route of migration prove quite as complex. The "Parent Stream" theory, as advanced and substantiated by Gilbert (1914-1924) and Fraser (1920) and others, requires that each salmon under normal conditions, return to the area from which it came and in which it was reared. How it does so, what influences direct the movement, whether physical or chemical or both, remain unknown. Certain experiments in British Columbia by Craigie (1926) on Sockeye Salmon in 1925 attempted to determine the influence of the olfactory sense upon the migration. Owing to the small number of individuals tagged and the few returns, the results are not conclusive, but as the author states (p. 223) "The elimination of olfactory sensibility appears definitely to interfere to some extent with the migration of the sockeye salmon but whether by removing guiding impulses or in some less direct way is not clear."

It is one thing, however, to conceive of salmon confining themselves by choice to one river system and quite another to believe that rigid selection occurs even in the tributary streams. Yet such is believed to be true, for in no other way can the presence of distinct races in different tributaries be maintained In connection with the investigations being carried on at Cultus Lake, B.C., upon the Sockeye salmon (Foerster, 1928), certain data have been obtained which it would seem advisable to record at this time.

Investigations carried out by Chamberlain (1907) in Alaska seemed to indicate that the Sockeye in leaving the sea selected those streams in which the water was of a higher temperature than the surrounding salt water. He states (p. 72) that "it may be postulated that streams with lakes at levels accessible to salmon possess a higher summer temperature than streams of similar volume without lakes. There is a class of streams, however, such as that at Bartlett Bay where the lake outlet furnishes only a small part of the volume of the main stream. In the Bartlett Bay stream a temperature of 46° at the mouth on June 26 decreased to 39° before the lake in which the Sockeyes spawn was reached. The main volume of the stream is glacial water and there is nothing at the mouth to indicate to human intelligence the existence of lakes and suitable spawning beds in its course. With even this temperature, however, the river was probably warmer than the surrounding salt water, in which ice was floating."

On the other hand Ward (1922, 1927) has found instances in which the reverse condition prevailed, namely, that in making a selection between streams or between a river and a tributary stream, the salmon ascended that fork in which the water was of a lower temperature.

The data presented below, covering a period of several months preceding and during the annual

spawning migration to Cultus Lake, substantiate in part both the Chamberlain and Ward theories and may be taken as indicating that the temperature factor cannot be considered as playing a direct role in influencing the direction or route of migration.

The route of the Cultus Lake Sockeye may be traced on the rough map (not drawn to scale) in Figure 1. After entering the Fraser River they proceed for a distance of some 70 miles before turning into the tributary stream, Sumas River. They advance up the latter approximately 5 miles, avoiding the entrance to Sumas Creek one mile from the Fraser, and at the junction of Sweltzer Creek and Chilliwack River they ascend Sweltzer Creek to Cultus Lake. There is a run of Sockeye, however, that, following the same route as above, select the opposite branch at the junction of Sweltzer Creek and Chilliwack River and ascend Chilliwack River to Chilliwack Lake, some 25 miles east of Cultus Lake.

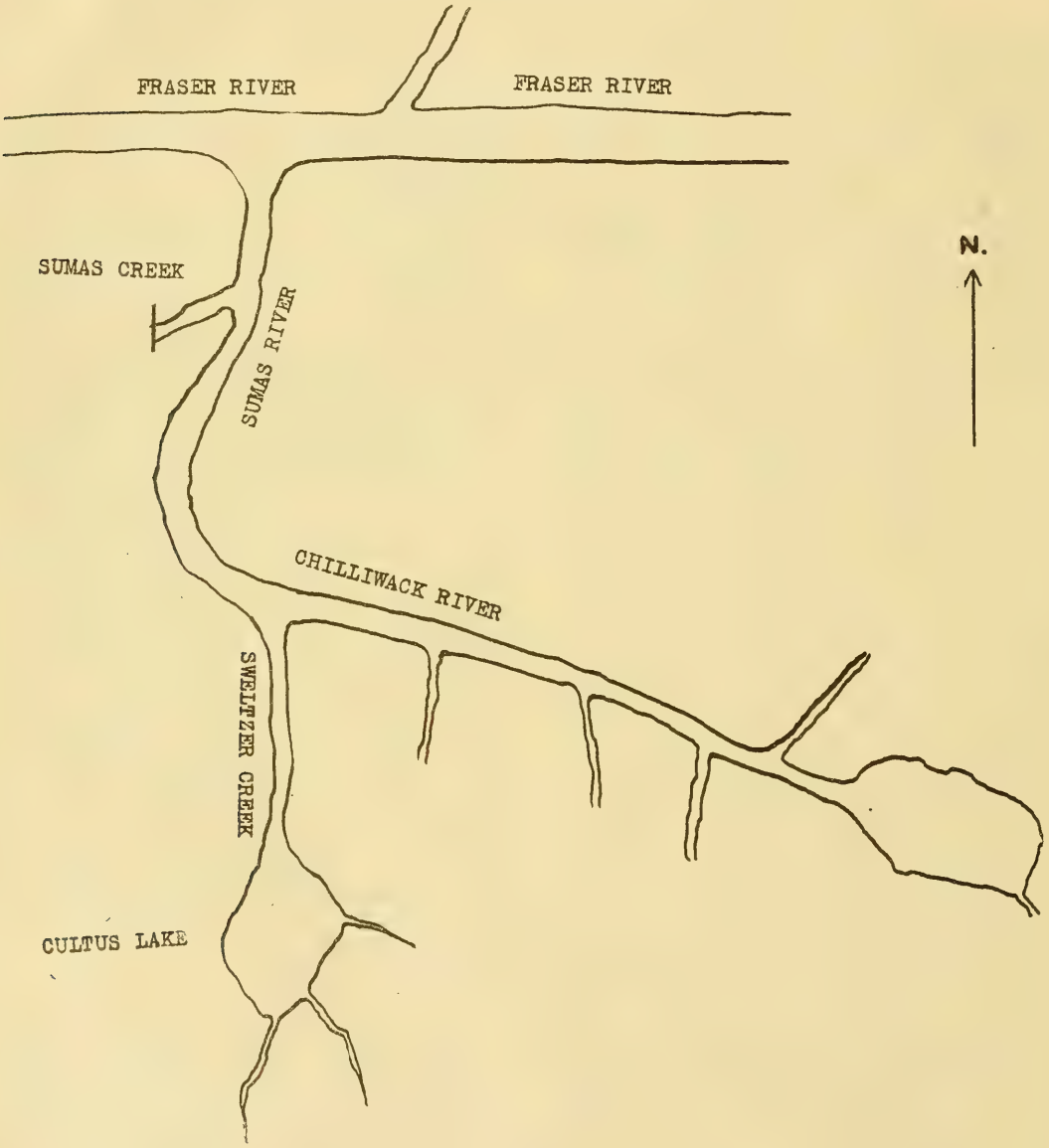

FIGURE 1.—Map (not drawn to scale) showing the relationship of the streams in the Cultus Lake area in connection with the upstream migration of Sockeye Salmon

The temperature records, taken by modified depth thermometer described in Foerster (1925), in this system for the summer and fall are tabulated below:

1926	June 16	July 21	Aug. 8	Aug. 30	Sept. 16	Oct. 14	Nov. 15
Fraser R.	13.25	17.0	17.75	16.0	14.0	10.0	4.75
Sumas R.	14.0	19.5	19.5	15.5	13.0	9.5	6.0
Sumas C.	.....	.....	.....	.....	14.25	11.5	.....
Chilliwack River..	12.0	17.0	17.5	14.0	13.0	9.75	5.75
Sweltzer C	17.0	23.0	20.0	19.0	18.0	13.0	9.5

The first Sockeye entering Sumas River from the Fraser were noticed about August 8 and by August 16 a considerable migration had occurred. Unfortunately temperature records during the run were not obtained and the effect of the difference in temperature between the Fraser River and Sumas River cannot be ascertained. The fish proceeded up Sumas River to the junction of the Chilliwack River and Sweltzer Creek. The former stream has a much greater volume and flow of water (probably ten times) and is invariably much colder. These fish therefore substantiated Ward's theory in ascending Chilliwack River. A few stragglers, on the other hand, were caught at Cultus Lake.

One month later the regular run to Cultus Lake commenced and continued until about December 1st. According to the temperature readings, on reaching the junction of the Fraser and Sumas Rivers they turned into the water of the latter stream which was slightly colder during September and October, but warmer on November 15. Ascending Sumas River they avoided the warm water of Sumas Creek and arriving at the junction of the Chilliwack River and Sweltzer Creek turned (in absolutely opposite fashion to the Chilliwack Lake run of August) into the very much warmer and less rapid water of Sweltzer Creek. From observations carried on over a number of years, conditions in 1926 were considered quite normal and the behaviour of these salmon taken as a racial characteristic.

There is here presented, then, one outstanding instance in which it is definitely established that while one race of Sockeye salmon may, at a junction between two streams, select the colder, another race, following exactly the same route, may select the warmer. Furthermore, during the same migration, they may, at one point, select a tributary bearing colder water and, at another, ascend the warmer.

In other words temperature cannot, broadly speaking, be a prominent directing influence. It may later be proven to be associated with racial characteristics or it may have, within limits, no influence whatever.

pH or Hydrogen-ion concentration.

In conjunction with the temperature readings the determination of the hydrogen ion concentration of the waters of the several streams was made. The determinations were made colorimetrically with LaMotte standard apparatus and may be tabulated as:

	July 21	Aug. 8	Aug. 30	Sept. 16	Oct. 14	Nov. 15
Fraser River....	8.0	7.9	7.8	8.4	8.0	7.8
Sumas River....	.....	7.6	7.4	8 0	7.6	7.4
Sumas Creek....	.....	.....	.....	7.8	7.4	.....
Chilliwack River.	8.0	7.9	7.8	7.6	7.8	8.8
Sweltzer Creek...	8.0	7.5	8.0	7.8	7.4	7.8

In this instance it is seen that Sumas River water possesses a lower pH or higher acidity than the Fraser River water. As the fish proceed up Sumas River, however, they encounter a gradual increase of acidity and at the junction of the Chilliwack River and Sweltzer Creek they find a varying degree of difference. At the beginning of the Cultus Lake run, September 16, they pass from a pH of 8.4 to pH 8.0 and from pH 7.8 to pH 7.8, avoiding pH 7.6. of the Chilliwack River. During the run (October 14) they pass from pH 8.0 to pH 7.6 and pH 7.6 to pH 7.4, avoiding again the higher pH 7.8 of the Chilliwack River. At the end of the run, November 15, they pass from pH 7.8 to pH 7.4 and from a slightly higher pH of 7.6 below the junction of Chilliwack River and Sweltzer Creek pass to pH 7.8, avoiding the much higher pH of 8.8 in the former branch.

In each case they pass to a water with somewhat lower pH but at the same time they avoid the water of Sumas Creek which is in all instances lower in pH than Sumas River. This fact may be due to other factors intervening which have not been recognized but on this occasion it seems advisable to avoid any definite conclusion.

The *oxygen content* of the water of the various streams was also determined (by Winkler method) but seemed to play no influential part in a directive way. As regards the waters of the Chilliwack River and Sweltzer Creek, the former was constantly at a higher percentage saturation than the latter and did not seem to have a discriminating force.

The *carbon dioxide content* of the several waters of the system under discussion was not obtained, partly due to the fact that a satisfactory portable apparatus for the determinations was not available and partly because, in the few tests made, the amounts of carbon dioxide present seemed to vary little. Powers and Hickman (1927) have recently found that the carbon dioxide tension is lower in lakes and rivers draining lakes than in rivers not fed by lakes. This factor may or may not have a directive reaction but the carbon dioxide tension influence at the junction of Chilliwack River and Sweltzer Creek would probably be minimized by the fact that both streams have their origin in lakes, though one or more tributaries of the former may not be lake-fed.

In conclusion it may be said that from the results deduced from the data obtained in the Cultus Lake system no general rule can be devised with which to correlate the reactions of salmon to temperature, hydrogen ion concentration or oxygen, except it be that different races of salmon, through inherited characteristics, react in different manner, and in the case cited, in opposite degree. It seems only reasonable to believe that some physio-chemical attribute or attributes of the waters traversed, either singly or in association, direct the route of migration but the determination of the directing constituents seems yet far distant.

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SEMI-PRECIOUS LABRADORITE IN CANADA

By J. B. MAWDSLEY

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SMALL ornaments and jewellery of various descriptions are made from the comparatively little known mineral labradorite. The semi-precious variety of this mineral has an iridescent play of colours that resembles the iridescent brilliance of a butterfly's wing. The colours are mainly blues but purples, greens, bronze yellows and greys are also known. A really good piece of this mineral, when polished, rivals in its colours the tail feathers of the peacock. The ornaments made from it, with their usually iridescent play of colours, have a charm and beauty all their own.

Little information is obtainable concerning the consumption of decorative labradorite in the various arts. Still it seems reasonable to expect that a cheap supply would find a ready market.

Labradorite is a member of the plagioclase group of feldspars. Like the rest of the group the crystal form is monoclinic, it has three good cleavages, a vitreous lustre and is too hard to be scratched with a knife. A cleavage face may show a minutely banded pattern due to the reflection of light from long narrow parallel faces at a slight angle to one another. This striking twinning phenomenon is a characteristic of all the plagioclase group. The colour of labradorite crystals varies all the way from colourless through mauve and grey to nearly

black. Some of the dark varieties have a greenish cast. It is in the deep grey variety that the iridescent colours are the finest. This play of colours is due to minute inclusions (1) and when these are absent the mineral is colourless.

Labradorite occurs with the more basic igneous rocks, particularly the rocks of gabbro composition which cooled deep within the earth's crust, and is rarely associated with the acid minerals such as orthoclase or quartz. Although the mineral occurs also in basic dyke rocks, it does not form crystals sufficiently large to meet the demand for decorative purposes. The iridescent ornamental variety is largely obtained from basic rocks almost completely composed of it which are known as anorthosites. The name is derived from the French word "anorthose" meaning plagioclase (3). Anorthosites are exceptional in that most igneous rocks contain appreciable amounts of at least three minerals. The problem of their formation has not yet been settled to the satisfaction of most petrographers

Anorthosite rocks vary considerably in grain from large masses, having a grain of half-an-inch to one inch in diameter, to others composed of crystals measuring six inches to a foot and even larger. When fine grained, the rock is usually composed almost solely of labradorite, but when the large crystals are particularly well developed it often contains nests of dark opaque minerals, usually a brown hypersthene and a sub-metallic mineral, ilmenite. These impurities naturally limit the size of the blocks that may be obtained for decorative purposes.

When the masses of anorthosite have suffered metamorphism and folding they are fine grained and this is due in part at least to the crushing of the large crystals (5). In places, masses and shreds of the coarse anorthosite are found surrounded by the finer grained variety.

The colour of anorthosite rocks varies a good deal. Fine grained dark varieties of anorthosite are known. Usually when fine grained, they are light in colour, being of various lilac shades of mauve. Merrill (6) states that some anorthosite of this colour fades on exposure to the weather. This light colour is due to the whole or partial absence of the dark minute inclusions found in the dark grey iridescent variety.

Crushing and metamorphism may have had something to do with the formation of a light fine grained anorthosite from what once was a dark, coarse-grained rock formed of labradorite crystals full of dark inclusions.

The large dark iridescent crystals are those suitable for semi-precious purposes. The dark fine-grained varieties are occasionally used for purposes that require large slabs or blocks. The light coloured rock although not as striking in appearance as the dark iridescent type has possibilities as a decorative stone (7) (8).

Anorthosite areas in North America are confined to the northeastern part of the continent. Large masses, irregularly spaced and of varying size, lie in a northeast and southwest belt extending from the Adirondacks in New York State along the north shore of the St. Lawrence to the Labrador coast. The southwest part of the belt is narrow but rapidly widens as the Labrador coast is approached. Great bodies of this rock are found on the shore of the St. Lawrence north of the island of Anticosti and to a distance of over four hundred miles inland. Most of them are as yet but little known as this region is still largely unexplored. The best known Canadian occurrences are as follows:

The Morin anorthosite and smaller outliers are 50 miles northeast of Montreal, and have an area of 900 square miles. They were mapped in detail by Adams, and, although they contain quantities of the dark violet type, there is, apparently, no iridescent labradorite of note (7) (4).

The Montmorency anorthosite lying just north of the city of Quebec, has an area of about 100 square miles. It, also, does not appear to contain the iridescent variety.

The St. Urbain anorthosite, lying just inland from the St. Lawrence 60 miles northeast of Quebec city has an area of over 100 square miles. All shades from colourless to a dark violet are here found but no iridescent dark labradorite is present (9).

The Lake St. John anorthosite is a tremendous mass of at least 5,000 square miles. Apparently there is here also none of the dark iridescent type (10) although dark violet types are known.

The large anorthosite masses along the north shore of the St. Lawrence near Anticosti island and in the interior must aggregate many thousands of square miles. Their extent is at present not well known but many references to large iridescent labradorite crystals are found in reports by both Low and Selwyn. The points where these iridescent crystals are known to occur are notably along the northeast shore of Lake Michikamau, Lake Ossakmanuan and Burnt lake at the head waters of Romaine river (2). These areas lie from 350 to 150 miles north of the St. Lawrence at a point opposite to the island of Anticosti.

A promising area of iridescent labradorite on tide-water was also found by Selwyn (11) on the

north shore of the St. Lawrence 50 miles west of Romaine river at Sheldrake Point.

On the Atlantic coast masses of anorthosite are found in the southern tip of Labrador and on the adjacent islands in the Straits of Belle Isle, and here, also, the dark labradorite is found. In fact the mineral was first described from this locality and derives its name from the region.

From the foregoing rough survey of the known anorthosite areas it can be seen that anorthosite can be obtained at many points in the province of Quebec and in Labrador, but rock for purely decorative purposes is confined probably to the eastern part of the province and the Labrador coast. The desposits that might prove of economic value both from a point of view of quality and accessibility are the deposits described by Selwyn (11) at Sheldrake Point on the north shore of the St. Lawrence opposite the western end of Anticosti and the depsosits at St. Michael bay, Labrador, and some of the adjacent islands. The deposits on the Moisie river, 50 miles west of Anticosti island on the north shore of the St. Lawrence might disclose economic deposits similar in character to the rock found at Sheldrake Point.

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IS IT RIGHT TO PROTECT THE FEMALE OF THE SPECIES AT THE COST OF THE MALE?

By OTTO SCHIERBECK

WHEN taking over office as Chief Forester I found that the Game Wardens throughout the Province of Nova Scotia reported to the Game Commissioner regarding the stand of game in the different districts. They reported as follows: moose plentiful; moose scarce; some moose in my district; a few moose, etc. It will be quite apparent that it is impossible to form any adequate idea of the stand of game in the Province through such inadequate means. The only possible way of forming a proper policy for the protection of the game is by procuring statistics. I, therefore, immediately gave orders to all the Forest Rangers in the Province to procure as good statistical data as possible in their districts, especially in regard to the proportion between the sexes.

This work was followed up during the past winter with an investigation of the stands of moose throughout the Province, so as to find out the proportion of bulls, cows and calves. The work was done on the deep snow during the winter months by Forest Rangers who had also considerable help from local guides. The different moose yards throughout the Province were visited and pains were taken to be sure that the sexes were rightly defined.

When deep snow covers the ground, the movements of the moose are restricted to comparatively small areas. The well trodden paths and areas that they form in snow constitute the well-known moose yards.

Previous to this winter's work account was taken in a number of localities during last summer to ascertain how many cow moose were with calf. The Rangers had orders to be very sure during this investigation that the calf of the cow was not in hiding. They were also guided by the appearance of the cow moose, whether or not she was with calf. It is generally believed that a cow moose of good appearance with a glossy fur and in good condition has been barren, whereas a ragged looking cow in poor condition is generally with calf.

In all 11,813 moose were counted; of these 2,232 were found to be bulls, 6,175 to be cows and 3,406 to be calves, making 19% bulls, 52% cows, and 29% calves. These figures check fairly well with the general figures procured

during the summer months by the Rangers. Approximately half the cow moose were without calf and there were three cow moose for every bull.

I had reports from practically all the Rangers, and I discarded all that were vague and unsatisfactory. The figures procured refer to the counties of Halifax, Lunenburg, and Guysboro, and parts of Queens, Hants and Colchester. These figures are not intended to be, in any way, a census of the moose stand in the country. Such a census would be very difficult to obtain; but the figures comprise a great number of independent counts throughout the Province and should therefore give a good figure for the proportion between the bulls, cows, and calves.

These figures are very alarming. They decidedly show that the senseless killing of bull moose is responsible for the many barren cows.

Since 1909, 18,527 bull moose have been reported killed in Nova Scotia. There is no doubt that a number of cow moose have been killed illegally, but this number must be comparatively small. Under the supposition that only half the calves that are born are bull calves, it can easily be seen that this continual killing of bulls is throwing the proportion between the sexes altogether out of balance.

Contrary to all reports there is not the slightest doubt that the moose is decreasing throughout the Province. The fact that the kill is increasing does not prove that the moose is increasing, especially as the number of moose hunters is increasing from year to year by leaps and bounds. The era of the motor car has made it possible for the moose hunter to get around in much higher degree than in the olden days of the horse and buggy, and shank's mare. This decrease will continue and get bigger from year to year as the proportion between the sexes becomes more and more disturbed.

The critics of the present moose law seem to have forgotten altogether that the male is just as necessary for the propagation of the species as the female. If a bull is shot before he has mated the loss in calves is just as great as when a pregnant cow is killed. The sportsman's way of killing moose is by calling the animal in the mating season and shooting it when it has responded to the imitation of the mate's call. The calling season is the period when the moose courts his future mate, when he fights terrific battles with his rivals; and, when he finally selects his bride, they go off in the woods together and mate, remaining together for most of the winter. The calling season generally finishes about the middle of October and most of the bull moose are shot on the call during the first days of the open season. Practically all the bulls shot in these days have not mated. The loss to the future stand is therefore just as great as if a bull moose shot in October had been a cow moose shot in December.

I have compiled, from the affidavits for the kill of October, 1927, the percentages of moose killed during consecutive five-day periods in this month. It will be seen that 72.4% of the bull moose were killed in the first fifteen days, and I am convinced that very few of these moose had mated.

PERCENTAGE OF MOOSE KILLED

October, 1927	Percentage
1st-5th	33.8
6th-10th	21.1
11th-15th	17.5
16th-20th	5.8
21st-25th	8.1
26th-31st	13.7

The bull moose produces a new set of horns each year. It will be evident that the production of these magnificent and heavy antlers requires a great amount of energy, and is quite an effort and a demand on the vitality of the animal. The stronger and more vigorous the animal is, the better spread of antlers it can produce. Therefore, the strongest and best propagators of the race are the bulls with the greatest spreads of antlers, and it is just these animals that the sportsman is after. Many a bull with a small spread of horns has been passed over by the sportsman who wanted a regular trophy to take home. This selection is bound to cause a degeneration of the race.

It is generally considered by biologists that the moose is monogamous which makes this killing of the male much more serious. The general idea prevailing among laymen is that the moose is highly polygamous, that one bull often has a harem of as many as eight or ten cows. If nature had intended that the bull moose should have about an average of eight mates, it would have provided accordingly. For every male calf born there would be eight female calves The fact that about equal numbers of male an. female calves are born is, to my mind, the best argument for the monogamy of the moose. One of the strongest arguments put up by laymen for the polygamy of the moose is the fact that domestic cattle are highly polygamous. The layman does not take into consideration the fact that the race of domestic cattle has been developed during a period of at least four thou-

sand years, during which period the male has been killed for meat, whereas the female has been kept for milking purposes. By killing off the male for such an enormous span of years a polygamous race has been created. Nature has counterbalanced this artificially created polygamy by changing the mating season of the domestic cow. The domestic cow will mate every three weeks the whole year round, after her calf is born, whereas the wild animals have only one mating season of comparatively short duration.

It will be evident to everybody that it is impossible to go eternally on protecting the cow and killing the bull. Simple mathematics will show that this procedure will annihilate the bulls. The point then arises—when to stop? The Province of Nova Scotia has, to my mind, passed this point, the foregoing statistics proving this conclusively.

The Department, therefore, recommended, prepared, and submitted an Act to the House, during last session, to allow the killing of cow moose during the first ten days in December. This legislation cut off fifteen days of the calling season and substituted for those fifteen days, ten days in December when it was allowed to kill both sexes. No hunter who had a license in October could obtain a license in December. Working under the supposition that the same number of animals would be killed in the two season, of (in all) forty days' duration, allowed by the new legislation, as in the old season of forty-five days' duration, practically the same number of moose would be killed as last year. The only difference being that a comparatively small percentage of the kill would be cows, which would mean that a corresponding number of bulls would be saved.

This legislation has now stood its test and 561 cows were killed during the ten days in December. Great care was taken in procuring as complete statistics as possible from this kill and these statistics bear out, in every way, the argument of the Department. Of the 561 cows killed 273, or 52%, were barren; 252, or 48%, were in calf; 36 of the affidavits received from the hunters gave no information as to whether the cow was barren or in calf. Letters written to these hunters brought no replies. It is generally considered that the cow moose has one calf the first time she is calving, and then two calves the following year, quite frequently three. The hunters report, however, that only 21, or 8%, had two calves, and no cows were reported as having three calves. This is a phenomenon of degeneration. In the two seasons there have been killed 1,116 bulls, which is 231 less than were killed last year. 843 of these bulls were killed in October, 273 in December. There were sold in both seasons 10,751 licenses, being 3,182 more than sold last year. Of these licenses 5,079 were sold in October, and 5,672 in December. In all, there were 330 more moose killed than in 1926; of these 273 were worthless, barren cows.

In dealing with this question the following facts must be borne in mind. The game of a country must serve two purposes. First, to provide pleasure for sportsmen and tourists and thereby, through licenses, give revenue to the Government, and through the hiring of guides, buying of supplies, hotel trade, etc., give revenue to the population at large. Second, to the farmer who lives in the vicinity of the forest the game provides a cheap winter food and the fur-bearing animals provide him with an income from trapping. The Canadian farmer has an ingrained love of liberty and strongly resents any restrictions, especially in regard to game. The old-time severe game regulations of the Old Country, inflicting heavy punishment upon poachers on the big nobleman's estate, were often the cause of deportation of the offenders to the Colonies, and one of the outstanding signs of freedom in the New Country was the entire absence of any restrictions in hunting rights. Effective game protection, however, can only be achieved if these two conflicting interests will "bury the hatchet" and cooperate in a proper understanding. The sportsman must recognize the farmer's rights and the farmer will then see the advantage the sportsman furnishes him by giving him work as guide and creating a market for his products.

The idea is prevalent throughout the country that our big game is a great source of revenue to the Province from non-residents, American hunters. This idea is erroneous. Allow me to point out that we only sold one hundred and seventeen Non-Resident Game Licenses last year; one hundred and twelve in 1925, and one hundred and eleven in 1924. In other words the Province only received a revenue of about $5,000.00 from these Game Licenses. If we suppose that each of these non-resident hunters spent about $200.00 during his trip, for guides and provisions, it will be seen that the total revenue derived from tourist hunting is only around $25,000.00. The real tourist attraction in the Nova Scotia woods is fishing which is indulged in during the months of the summer holidays. Very few people can afford to go hunting in the fall months and few tourists are

sufficiently hardy to sleep out of doors in tents during the cold weather.

The moose, and for that matter all the wild game, has much more importance to the Province alive, on account of the glamour it gives to the woods when seen by the fishermen and tourists, than it has as the prey of a few sportsmen.

Hitherto, the game legislation here in Nova Scotia has always been dictated by the sportsmen who were principally interested in hunting for trophies or heads. The farmer or the woods people living in the outlying districts who were interested in the game because it provided them with food for the winter, were contemptuously called pot-hunters. In my travels throughout the Province I have very often heard the farmers and woods people protest against the Game Act of the Province. They were unable to understand why they should preserve the moose that were roaming on their own land for the benefit of a few sportsmen. This argument is without a doubt behind a number of the illegal killings which have undoubtedly gone on in the Province. The country is so big that it is impossible, without very heavy outlays, to enforce the Game Laws. Proper enforcement can only be reached through the good will and help of all the woods people and farmers living in the outlying districts and this good will can only be obtained if these people see that they have just as big an interest in the game as the sportsman; that they have the same chance for getting their moose.

DEER

Practically the same remarks that apply to the moose apply to the deer. The statistics of the killing in December show an enormous number of buck deer killed. 75% of the deer killed were buck deer, and of the 25% of does killed, 82% were barren, only 18% being with calf. These figures are not so alarming as they appear. First of all the deer mates later in the year than the moose, therefore the embryo is more difficult to detect so early in the season, and moreover only about one hundred doe deer were killed, which to my mind is not a sufficient number to provide reliable statistics. There is, however, not the slightest doubt that the buck law, also in the case of the deer, has caused considerable damage to the stand.

NOTES ON A COLONY OF GLAUCOUS-WINGED GULLS IN THE GULF OF GEORGIA, B.C.

By THEED PEARSE

IN No. 7, Vol. 37, of *The Canadian Field-Naturalist* (October, 1923) appeared some notes as the result of banding operations in connection with a colony of Glaucous Winged Gulls (*Larus glaucescens*) at Mittlenach, an island in the Gulf of Georgia, B.C. The writer visited the colony again on 25th July, 1925, twice during 1927, the 16th to 18th July and 14th August being spent on the island, and on 13th August, 1928.

These visits, taken in conjunction with the previous ones, give a period of nine years during which this particular colony has been looked over and provide material for some interesting questions.

First, to give the results of the above visits. In 1925, 72 birds were banded and there were, as well, over two hundred eggs unhatched or youngsters too small to band. In 1927, on the first visit, the island was pretty throroughly worked over and produced six birds old enough to band with the addition of seventy-two nests with three eggs, fifty with two, twenty with one egg and eight nests where eggs were chipping or the young too small to band—a total of 150 actually occupied nests. Besides there there were, at least, as many nests that were still awaiting eggs. Time did not permit of such an exhaustive search on the next visit, in August, but the area covered was sufficient to show to what extent the three hundred possibilities had materialized. Only fifty birds were banded and three left as too small. It was then evident that many of the nests had never reached the stage of containing young at all. It is not difficult to decide whether a nest has produced young as it soon gets flattened out and is, also, usually soiled with excreta.

In 1928 the island was again gone over pretty thoroughly; result: seventy-two birds banded, six left as too young and three nests of eggs.

The number of old birds has not varied much from year to year as far as it has been possible to estimate, round about four hundred pairs; though there did not appear to be so many birds this year as last. Four hundred pairs and three hundred nests (allowing for those overlooked, etc.) agree and it is when it comes to the number of young that the discrepancy arises. It may be

suggested that the young birds were hidden, especially as parts of the island carry a heavy covering of Bracken but the shortage was just as apparent where cover was absent. Then, too, the young gull does not seek cover for protection, depending rather on its own protective colouring. Certainly the nestlings had not flown, on no occasion have there been as many as a dozen, birds of the year, on the wing.

In the previous article the same shortage of youngsters was referred to and attempts were made to account for it, the suggestion then being that the fishermen and Indians were the culprits. There is no doubt that quite a number of eggs are lost in this way but it has been rather notable that young birds have, on the last two visits, been more numerous around the regular boat landing where the eggs would be more easily taken. This year there were quite a number of egg shells lying around where the fishermen camp.

Crows may be a serious menace and in 1928 there were sucked eggs about but they were very few in other years. In 1927 there was a flock of well over a hundred Crows around and some had nested there, but this year the only flock seen came in late, apparently to roost, and left early and there were few birds around at other times. Last year a Horned Owl was shot on the island, and there may have been a pair judging from the actions of the Gulls. One, and probably a pair, was there again this year. Both years remains of mature Gulls have been found that may have been killed by owls but never have partially eaten young birds been found. This year a beautiful female Duck Hawk was about the whole time but the Gulls did not seem to resent its presence or even its stooping at them, merely getting out of the way with some squawking. Very different with the Owl, the appearance of which caused a perfect furore among the Gulls and Crows. One thing, if the Crows are the depredators a good word must be put in for the Owl or Falcon as there were the remains of a Crow that had undoubtedly been killed by one of them. As pointed out before, it is evident that the loss is in the egg stage, which should exonerate both Falcon and Owl.

Mr. G. D. Sprot, who was one of the party in 1928, has put forward the theory that the sheep, grazing on the island, are the accountable parties by breaking the eggs. He noticed that wherever sheep droppings were thickest there would be found numbers of nests without any young but with some clean (unincubated) egg shells and the nests showed signs of having been disturbed. The sheep would nose up the nests hoping to find some blades of grass. Certainly the sheep have been there on each occasion and the island gets very dry in summer. If this is the reason, it is only another instance of where it is the interference by man that is at the bottom of the trouble and where it would be so easy to say that it was the natural enemies that were reducing the numbers.

This year there were quite a number of snakes on the island, presumably the ordinary Grass Snake, but unusually large and dark in colour; they seemed, however, to frequent the places where the grasshoppers were extra numerous. and we did not come across any in or near nests. We heard of a new use for snakes on Mittlenach—the Indian who fetched us back landed but beat a hasty retreat when he came across a snake and told us that these snakes were Rattlers that had been placed on the island to prevent people stealing the sheep. We thought it best not to attempt to disabuse him of the idea.

In 1927 it was possible to check up conditions with Bare Island (150 miles south, off the extreme end of Vancouver Island); Mr. J. A. Munro told me he was there on the 21st July, 1927, when there were many young birds out, some being ten days to two weeks old. This colony is protected and has no sheep, it is also a much larger one numerically. Of course there could have been no such forward birds on Mittlenach on the same date, but here we have a colony existing under the most favourable conditions and only able to produce young birds by the end of the first week in July, late compared with much more northerly locations. Food supply may have something to do with it but the evidence from both Mittlenach and Bare Island is that the Glaucous Wing, nesting at its extreme southern limit, is later.

Actual results of banding operations are shown by "recoveries" and these have been few. Excluding 1928, some four hundred birds have been banded over a period of six and a half years and eleven have been accounted for. A bird banded in 1922 was recovered on 4th February, 1927, a few miles away from the island; other winter records from the neighbourhood have been: 3rd December, 1925, of a 1923 bird; end of February, 1928, of a 1925 bird; and two birds in the winter following banding. The furthest point has been Seattle, Wash., of a bird, in September, banded two years previously. In the previous article it was suggested that these Glaucous Wings nesting around here do not migrate much and certainly the more recent recoveries bear this out.

CONTRIBUTION TO THE KNOWLEDGE OF THE AVIFAUNA OF NORTH-EASTERN LABRADOR

By BERNHARD HANTZSCH

"Beitrag zur Kenntnis der Vogelwelt des nordöstlichsten Labradors," von Bernhard Hantzsch, *Journal für Ornithologie*, Sechsundfünfzigster Jahrgang (56th annual publication), No. 2, April, 1908, and No. 3, July, 1908. Leipzig. I. Allgemeiner Teil (General Part), pages 175-202. II. Besonderer Teil (Detailed Part), pages 307-392.

(Translated from the original German text in the Emma Shearer Wood Library of Ornithology, Library of McGill University, Montreal, by M. B. A. Anderson, M.A., and R. M. Anderson, Ph.D., Ottawa, 1927.)

Continued from Vol. XLII, page 227).

Charadrius dominicus dominicus Müll. [53] [p. 362]. *Amerikanischer Gold-Regenpfeifer.* —AMERICAN GOLDEN PLOVER.

Eskimo: *Ungilite, -tik, -tit* (according to von Schubert's informant, from *unge* = armpit, perhaps because the bird in distinction from most other relatives does not possess white, but darker, axillary feathers.

Not common migrant, probably especially in autumn. Nothing is known of breeding in our district. Bigelow saw several flocks after 22nd August, 1900, mostly young birds, on the northeastern Labrador coast (1902, p. 29). I observed two young creatures myself on 2nd September near the mission house at Killinek. In raw, windy weather they ran about, not very shyly, on a grassy slope, and also kept quiet when flying away. Because it was Sunday, I unfortunately had no gun with me, since at request of the missionaries I did not shoot near the station on holidays. Some days later, Missionary Perrett, who had repeatedly secured the species in the south, observed a single bird. In many years they are said to occur rather abundantly.

Aegialitis hiaticula semipalmata (Bp.) [54]. [p. 362]. *Amerikanischer Sand-Regenpfeifer.* —SEMIPALMATED PLOVER.

Eskimo: *Kullekulliak, (Kullerkoliak), -ak, -at* (according to von Schubert's informant, on account of the voice sounding similar).

Rather common breeding bird and migrant; breeds on flat parts of the coast near the shore and also farther in the hinterland, usually several pairs in one neighbourhood. I secured clutches from the immediate vicinity of Killinek. The species is also a widely spread breeding bird in southeastern Baffin Island. When Kumlien, however, supposes (1879, p. 83) that the European form *Æ. hiaticula* (L.) was more common at that place than *semipalmata* (Bp.), and that both birds were clearly distinguished by the Eskimos, he may perhaps refer to young and old individuals of *semipalmata*, particularly as Kumlien does not state whether he collected skins of the birds at all. According to Winge's measurements of 26 skins in the Copenhagen Museum (Grönlands Fugle, 1898, p. 152), only *Æ. h. hiaticula* (L.) seems to occur in Greenland (p. 363). That this larger subspecies regularly flies over Davis Strait can scarcely be taken as a fact, however, according to the observations known at this time.

Ten skins of my collection, namely, four adult males, and five juvenile females pretty much or quite completely feathered out, from northeastern Ungava Bay, 13th to 19th August, as well as an adult female of 27th June, 1907, from Rama (breeding bird with eggs), show the following measurements: Weight in flesh: 42.5-48.6 g. (38-43.6 g.). Total length: 172-179 mm. (155-170 mm.). Spread of wing: 375-387 (352-375). Wings: 114-122 (106-118). Tail: 59-63 (46-62), 60. Tail = wings or exceeds these up to 6 mm. Bill: 12-13 (11-12), 12. Tarsi: 23-24 (22-24), 23. Middle toe including the 4-5 (3-3.5), 4 mm. long claw: 20.5-21 (19), 21 mm. Iris: dark brown, with the young somewhat more dusky; edges of eyelids of adults, yellow. Bill: anterior half black; base reddish-yellow to a bright orange-yellow; the lower mandible blackish in the case of the young, except for a little yellowish spot at the base. Feet: bright yellowish-brown to orange-yellowish; joints of toes washed with gray, on the posterior side mostly bright yellow-ochre; in the young especially, the upper sides duller and darker blackish-yellow.

Eight stomachs contained in eight instances small stones; in one instance fragments of mussel shells; in four instances small black snails; in two instances beetle remains; in one instance remains of flies, also one small brown seed (Rörig).

The birds which I observed kept in bands of four to ten individuals, occasionally also in company with *Actodromas fuscicollis* on the beach, especially numerous on an extensive sandy strip at Takpangajok Inlet. They were rather wary and even in an undisturbed state were restless and continually in motion. Even at night I repeatedly heard the rather loud, euphonious *Dui, Duit*, more rarely a rather short *Wit, wit* of flying birds which were calling each other together. When they come suddenly in to shore, they run about by the water hunting food in a rather loose formation, but usually soon fly away again without any apparent

[53] *Pluvialis dominica dominica* (Müller) of 17th Supplement to A.O.U. Check-list, 1920.—R.M.A.

[54] *Charadrius semipalmatus* Bonaparte, 17th Supplement to A.O.U. Check-List, 1920.—R.M.A.

reason. Their walk is not particularly fast, the flight, however, advancing easily and very swiftly. The young birds like to conceal themselves at rest among large boulders on the shore. The adults, however, one sees almost always only on open places if the wind is not blowing too strongly.

Arenaria interpres (L.) [p. 363]. *Steinwälzer.*—TURNSTONE.[55]

Eskimo: The Eskimos in the neighbourhood of Killinek said they had seen the bird, but knew no name for it. When I quoted to them the term used according to Fabricius in West Greenland and according to Kumlien in Cumberland Sound: *Telligvak, -vâk, vait* (etymology not clear, perhaps connected with *Tullik* = *Arquatella maritima, -vak* =large) they seemed to remember it and to understand it. [p. 364].

Rather rare migrant and possibly breeding bird now and then in our district. Special records about its occurrence in Labrador and neighbouring localities are inadequate. Turner records the species as observed occasionally on the coast of Ungava Bay; a young specimen of the same year was collected in middle of September, 1882; the bird is said to occur not rarely on the east coast of Labrador (Turner, 1886, p. 255). Kumlien did not meet it in Baffin Island, but says that according to the statements of several Eskimos who saw the Turnstone when they were taken along to Greenland, that it occasionally occurs in Baffin Island (1879, p. 84). This record, not extraordinary in itself, is confirmed by two skins collected in Cumberland Sound by Crawford Noble, Jr., and which are now in Marischal College Museum in Aberdeen (A. L. Thomson, *in litt.*).

I met two juvenile females, apparently siblings of the same year, on 23rd August, in a quiet inlet south of Killinek. It is possible that the birds were not hatched in a very wide radius. Anyway, they were fully feathered out.

Their measurements are as follows: Spread of wing: 468; 484. Wing: 138; 147. Tail: 70; 69. Tail +wing: 5. Bill: 21; 22. Tarsi: 26. Middle toe including the 5 mm. long claw: 24; 25 mm. Iris: dark brown. Bill: black-gray; lower mandible at base somewhat lighter. Feet: pale dark red-yellow, on the joints washed with gray; posterior side and soles dusky orange-colour.

The two stomachs showed the following contents: Crustaceans, especially the species *Talitrus saltator* Mont., and mineral substances, namely, sand and little pebbles, of these the largest were 3.9 ×2.7×2.2 mm. (Rey).

The two birds were found sitting quietly on rather large stones laid bare by the low tide, covered with sea-weeds and numerous little barnacles and mussels, and killed at once for fear of their vanishing.

Canachites canadensis labradorius Bangs[56]. [p. 364]. *Labrador Wald-Huhn.*—LABRADOR SPRUCE PARRTIDGE.

Eskimo: *Akkigerlek* (*Akkikgilek*), *-lik, -lit* (*Akkigek* = ptarmigan, *-lek* here probably has reference to the same brown colouring of the summer and winter plumage, a ptarmigan which is always coloured the same).

This clearly-marked form of the Canadian Spruce Partridge described by Bangs (in *Proc. New Engl. Zool. Club*, I, 1899, p. 47) and by J. A. Allen (in *The Auk*, XVI, p. 340), the subspecific separation of which is to be sure not recognized by A. H. Norton and others (compare *Portland Soc. Nat. Hist.*, II), inhabits (p. 365) all the wooded portions of Labrador rather commonly up to their northern limits in Ungava Bay (Macoun, I, p. 200). In the most southern limit of our more narrowly treated district, where a low forest growth begins to appear, according to dependable reports made to me from Eskimos there, this bird is said to be found, and to fly still farther northward, especially in spring and fall. After all, within our treeless stretch of country, it can only be an occasional visitor.

Lagopus lagopus lagopus (L.)[57]. [p. 365]. *Moor-Schneehuhn.*—WILLOW PTARMIGAN.

Eskimo: *Akkigervek* (*Akkigivik*), *vik, -vit* (from *Akkigek, -gik, -git* = ptarmigan in general, *-vik* = large; so "large ptarmigan"); the young *Akkigiarak, -kâk, -kat*, or also *Akkikiarsuk, -suk, -suit* (=a young ptarmigan).

That the bird under discussion should really correspond to our European form, appears to me very doubtful. Since at the present time, however, perhaps no one has at his disposal sufficient material for comparison, and as at the same time in this case very large series of different species are necessary for study, I see myself compelled at the beginning to keep to the usual naming.

The Willow Ptarmigan as a breeding bird inhabits only the more vegetatively favourable parts of Labrador, especially the wooded parts, but travels about during the periods of migration and also comes to our district as an occasional

[55]The Turnstone of this region is undoubtedly *Arenaria interpres morinella* (Linnaeus), Ruddy Turnstone, of the A.O.U. Check-List, 1910.—R.M.A.

[56]*Canachites canadensis canadensis* (Linnaeus). The Labrador subspecies is not recognized by the A.O.U. Check-List.—R.M.A.

[57]Clark (Proc. U.S. Nat. Mus. 1910, p. 53), Riky (Proc Biol. Soc. Washington, 1916, p. 233), and Hesse (Journ. f. Orn., 1915, p. 181), consider *L. l. lagopus* as the palæartic form of this species, and apply the name *Lagopus logopus albus* (Gmelin, 1988) to the typical nearctic form.

The 16th Supplement to A.O.U. Check-List, 1912, recognizes a new subspecies, *L. l. ungava* Riley, Ungava Ptarmigan, type locality, Fort Chimo, Ungava Bay. The characters are not very well differentiated, however.—R.M.A.

visitor. Macoun notes the species as abundant through all Labrador as far as Ungava Bay (I, p. 206). According to statements of the natives, the birds breed regularly at George River, and indeed even farther in Ungava Bay northward. Out from there may come the scattered individuals which at times are killed at Killinek, for example, one in the spring of 1906, according to Missionary Perrett. The few ptarmigan, on the other hand, which appear in our restricted district as breeding birds, might belong only to the following species.

Kumlien says, it is true, that he secured two specimens of the larger species ("*Lagopus albus*") in Cumberland Sound district, and besides this, that ptarmigan, according to the statements of the Eskimso are quite common in places in the interior of the country (1879, p. 83), leaving the question open, to which species they belong. It is not only certain then, that the ptarmigan which often come to Killinek in immeasurable flocks fly across from southeastern Baffin Island, but also, that these belong to the smaller *Lagopus rupestris*. At all events, certain regions in southern Baffin Island seem in respect to their plant growth to be far more favourable than northeastern Labrador. Perhaps differences also prevail in the faunal relations of the eastern and western coasts of this land, which we do not yet know.

Still for the whole of eastern Baffin Island (p. 366) it is to be assumed that *L. lagopus* does not appear as a breeding bird. If the Baffin Island Eskimos would know the two ptarmigan, so very different in size, they might also, like the inhabitants of Labrador, have two different names for them, of which Kumlien knows nothing. The record of this explorer concerning the occurrence of *Lagopus lagopus* in the Cumberland Sound district is in my opinion very doubtful, from the lack of clearness of his statement.

Lagopus rupestris rupestris (Gm.) [p. 366]. *Felsen-Schneehuhn.*—ROCK PTARMIGAN.

Eskimo: *Niksârtok, -tûk, -tut* (substantive form of *niksârpok* = to cough up, to belch; after the voice).

According to the statement of the inhabitants, the Rock Ptarmigan is a rare breeding bird, only on the slopes of the highest mountains in our district, especially of the Kallaruselik, where eggs were occasionally found. The Canadian *Neptune* Expedition in 1903 also secured five eggs of this species at Cape Chidley (Eifrig, 1905, p. 239). On the other hand, it is a common migrant in the spring, less abundant in the fall. I am going into these interesting facts carefully in the following.

Concerning the subspecies of *Lagopus rupestris*, there prevails clearness neither as to their validity nor their geographic distribution. On account of the almost uninterrupted, continuous change of the plumage, the claws, and even of the bill, which latter parts are thrown off in moulting, one may as material for comparison make use only of birds from the same month, for the summer plumage at best freshly-moulted breeding birds of the different districts. To compare summer plumages and summer plumages, or winter plumages and winter plumages, with one another is in no way sufficient, but on the contrary leads easily to mistaken conclusions. In the case of *Larus glaucus* I have already pointed out the exceedingly strong bleaching influence of the spring sunlight in Arctic regions, as long as ice and snow cover the landscape. Without doubt this is stronger in Baffin Island and North Greenland, for example, than in Iceland and Newfoundland. In the former localities, the freshly-moulted summer plumage, transient in itself, will soon assume a paler, grayer tone, while on the damp, high moors of considerably milder Iceland, which are free of snow much earlier, it can keep a brighter yellow-brown tone. The resident birds and birds of passage of certain districts, northern Greenland for example, are besides exposed to this bleaching influence for a longer time than the migrating birds, which often appear right at first in the half-completed summer plumage. Changes of colour of this nature, which do not even appear equally strong in all years, do not yet warrant them in being regarded as unique subspecific distinctions. That the winter plumage also, especially in the characteristic loral stripes, undergoes certain regular changes of a gradually stronger prominence, is sufficiently known.

On the basis of the literature, however, it seems in (p. 367) my opinion impossible at present to obtain a clear picture of the different subspecies of *Lagopus rupestris*, even if a few different writers on their part thought they saw the differences on the basis of large series of skins. The diagnoses are made so indefinite, and not once agreeing, however, so that it can be understood if certain ornithologists generally dispute the validity of the subspecies of the present species, although I scarcely believe that one of these dissenting people has carefully examined sufficient material in comparison. At present, to be sure, I am not capable, either, of giving better diagnoses in a manner satisfactory to me; but on the other hand, not in position to produce the proof for their disqualification. I believe rather in the necessity of discrimination.

Lagopus rupestris islandorum (Faber) is a resident bird and bird of passage in Iceland, scarcely ever leaves the island, and therefore has developed independent local characteristics after the cessation from a union with neighbouring districts.

Lagopus rupestris reinhardtii (Brehm) is also said to be a resident bird and bird of passage in Greenland, according to reports which agree, and never leave this district (Compare H. Winge, Grönlands Fugle, 1898, p. 125), and must perhaps be accordingly regarded as an endemic, single *Lagopus*-form there.[58]

[58]During the summer of 1928 I had the privilege of visitin the Danish Arctic Station at Godhavn, Disko, Greenland, and the scholarly naturalist, Dr. Morten P. Porsild, who has been Director of the station for over twenty years, mentioned the fact that considerable data on the moulting and other biological facts on the Greenland ptarmigan appears not to be well known in America, probably because much of it is

Whether this species goes across, and how far, in the extreme northwest to the districts west of Smith Sound, and perhaps is a resident bird there also, needs careful investigation. From the knowledge of the migratory bird nature of the ptarmigan of Baffin Island, however, there is no doubt with me that these can not belong to the same subspecies as the isolated Greenland birds. The statements of different authors (Compare Frank Chapman, Birds of Eastern North America, 1906, pl 183) that *L. r. reinhardtii* may inhabit the "northern parts of Labrador northward to Greenland," seem to me to be called forth by insufficiently sharp comparison of the birds of both districts and to be founded on nothing but theory.

I much rather assume that west of Davis Strait merely a subspecies occurs, to which the name *Lagopus rupestris rupestris* (Gm.) is to be given, in the southern parts more as a resident bird and bird of passage, in the northern parts under normal conditions as a migratory bird.

The form might, with exception of Newfoundland, where *L. r. welchi* Brewster, perhaps belonging here, is said to be the resident bird, represent the only form of *Lagopus rupestris* in Arctic America as far as the Pacific coast districts, where *L. r. nelsoni* Stejneger, *atkensis* (Turner), and *townsendii* Elliott, take their place.

Eight skins of my collection, killed on 4th to 6th October, in the neighbourhood of Killinek, in almost completed winter plumage, are characterized as follows: Weight in the flesh: 475-580 g. Total length: 344-380 mm. Spread of wing: 590-660. Wing: 175-200. Tail: 108-122. Tail+wing: 50-74. Bill length, from the beginning of the horny beak on the middle of the skull to the tip: 16-20; from anterior end of nostrils to the tip: 8.6-10; depth of the upper mandible at the nostrils: 5-5.5; width same place: 6.5-7.2. Tarsi: 28-35. (p. 368). Middle toe including the 13-16 mm. long claw: 35-40 mm. Iris: dark brown. Bill: horn-black, sometimes lighter at tip; comparatively delicate and a little arched and thick at the tip. (All of this shows clearly enough, for example, in 17 old birds of my collection from Iceland). The largest figures are shown with adult males. The measurements may thus be compared only with such individuals as are in the same condition of plumage. The measurements for length of bill, width of bill, tarsi, and middle toe are not to be determined with complete exactness on account of the thick plumage.

The contents of crops examined by me contained as many as 36 grammes of bitten-off leaves and twigs of different plants, especially of willows, as well as of *Arctostaphylos alpina* Spr.; in addition a number of seeds. In the stomachs were the softer parts of the plants already ground into a state where they could not be identified, the seeds of *Polygonum viviparum* L. and *Oxyria digyna* Hill. well preserved, however. I found besides 4 gm. pieces of white quartz of about 1-3 mm. size. I collected Mallophaga, one female of *Gonoides mamillatus* Rudow, one female of *Menopon striatum* Kellogg, and one female *Nirmus*, species undetermined, perhaps related to *N. alchata* N. (T. Müller).

Lagopus rupestris is also a migratory bird at Killinek. Indeed, it it thought that the few breeding pairs of the district are composed in the main of such creatures as through light wounds, delay, or other reasons, were induced to remain there. There may be a bit of truth in this. In the winter there are usually no ptarmigan in our

written in Danish. (See particularly Möller, R., Vildtet og Jagten i Sydgrönland [The Game and Hunting in South Greenland], Köbenhavn, 1906, 8vo., pp. 1-519, the biology of the rock ptarmigan race *reinhardtii* being treated on pp. 38-68. Also, Manniche, A. L. V., The Terrestrial Mammals and Birds of North-east Greenland, Meddel. om Grönland, Vol. 45, 1910, the East Greenland ptarmigan being treated on pp. 110-117, with 2 coloured plates of summer and autumn plumage; in English). Dr. Porsild has also given me a summary in translation of a recent paper (*Dansk Ornithologisk Tidsskrift*, 19, 1926, pp. 108-115) by Mr. E. Lehn Schiöler, the well-known Danish ornithologist, author of the monumental Danmarks Fugle (Birds of Denmark, including also species occurring in Greenland, Faroes, and Iceland, Vol. I, 1925, Vol. II, 1926).

Mr. Schiöler states that the Greenland ptarmigan do not constitute a uniform race, but that there are three distinct races: (1) *Lagopus mutus groenlandicaus* Schiöler, supsp. nov., in East Greenland, differing much from the West Greenland race as well as from the Icelandic and European forms. In West Greenland there are two races: (2) The southern race, ranging north to about 60° 67′ North, 'being referable to *Lagopus mutus reinhardtii* (Brehm), and (3) the form north of that latitude in West Greenland, to *Lagopus mutus rupestris* (Gmelin).

In order to determine which race should keep the name *reinhardtii*, Schiöler got the three Greenland specimens in Brehm's collection for investigation and decided that Brehm's *Tetrao Reinhardi brachyuros* is of the South Greenland race, and should stand as the type of *reinhardtii*. His two specimens labelled *Lagopus Reinhardi macruros* proved to belong to the northwestern Greenland race, which is provisionally supposed to be identical with the Arctic American *Lagopus mutus rupestris*, although lack of adequate material from America makes exact proof not possible at present. He suggested that if a future comparison should show differences a new name for the northern race would be needed.

To summarize briefly some of the characters given by Schiöler: (1) The East Greenland race (*L. m. groenlandcus* Schiöler) in the autumnal undulated plumage is light straw-coloured, having light sand-yellow colour and is thus much more yellowish-brownish than the Icelandic (*L. m. islandiorum* Faber) and of a colour quite different from the Scandinavian form (*L. m. mutus* Montin). The coloured plates in Manniche's above-quoted work, of birds in autumn plumage, have in reproduction become more grayish, and not light yellowish, as the specimens actually are.

(2) The Southwest Greenland race (*L. m. reinhardtii*) in the corresponding autumnal plumage is grayish brown, nearly approaching the typical *mutus*, but the colour has an olive-brown tinge, and in a large number of autumnal plumages will be found old birds nearly as light gray on the back as the Scotch form (*L. m. cinereus* Macg.).

(3) The Northwest Greenland race (*L. m. rupestris*), beginning with southern Strömfjord (66°), Holsteinborg (67°), Disko (69°-70°), and Umanaq (71°), shows the ptarmigan in autumn plumage as much darker than the preceding race. They may somewhat recall the Icelandic form in colour, but they do not attain its "warm" tinge. On the other hand, they are much darker than the sand-yellow East Greenland race. The northern ptarmigan also seem to be smaller than the southern birds.

The personal experience of the editor is that the white winter plumage of the ptarmigan are too undifferentiated to help much in solving the problems of geographic races. The spring breeding plumages are also rather difficult to separate. The most satisfactory plumage for comparative studies is the autumn plumage of the male ptarmigan, but owing to the habits of these birds, specimens taken in the very brief period of this stage, are difficult to obtain in the Arctic and consequently rare in collections. Virtually all of the large North American collections are lamentably lacking in adequate series of certain palæarctic forms, and the European ornithologists appear to be labouring under the same difficulty with regard to nearctic (North American) forms. It has long been our opinion that the proper systematic status of the subspecies or varieties of many holarctic forms will never be thoroughly understood until larger series of North American and Eurasiatic specimens are brought together and adequately compared.—R.M.A.

district, just as Kumlien and other visitors assert of Baffin Island.

Suddenly in early spring, mostly in April, seldom sooner, at times not until well into May, the wanderers appear from the south. Usually at first rather small advance posts are established. A short time after that the whole throng of birds follows. As I was assured by the missionaries, Messrs. Waldmann and Perrett, who each have passed a year up to 1906 in Killinek, by Mr. J. Kane who lived there six or seven years, as well as the Eskimos of the neighbourhood agreeing, countless large flocks of these birds appear at times, usually passing through rather high in the air. For hours they hasten in many thousands through the sky, so that their numbers cause astonishment. Many flights of the kind are observed from the same place. The birds mostly fly directly across Hudson Strait without delaying. This is almost always covered with ice in the spring and little to be distinguished from the land. The flight is so swift and high, that Missionary Perrett was in doubt whether the birds were migrating to Greenland, which can, however, be safely denied, according to the unanimous reports from there. The Canadian *Neptune* Expedition 1903-1904 observed a great migration of these birds at Fullerton, northwest Hudson Bay (Low, 1906, p. 318). Only a small percentage of the ptarmigan make a stop in our region in order to rest up and hunt food. The forerunners and the stragglers stop more frequentquently than the main swarm, the latter having perhaps not much farther to go to reach their breeding places. The birds which stop, halt mostly in flocks of ten to thirty, occasionally still more together, and they usually do not act particularly shyly. When contrary winds and hunger tire the creatures out, they are so tame that they can be killed with the long dog-whip. The captured birds form a much-preferred article of food for whites and Eskimos, indeed the latter devour even the entrails, especially when these are warm. Let no man ridicule, if these parts, lying near each other so smoothly and neatly, give to Nature's children a highly-prized delicacy, whose spicy contents of finely-crushed and half-digested plants cause it to seem rather good to the taste. One should let alone such customs of the unassuming people who so often have to suffer bitterly from hunger. The arrival of the first flocks of these birds is greeted as an event of the day, which controls all the conversation. Now everyone cleans his gun, and even the little eight- or ten-year-old chap is happy, whenever a gun is occasionally loaned him. If the ptarmigan appear in great numbers, an occurrence that varies much from year to year, then each one who has a gun and ammunition, from the missionary to the youngest Eskimo lad, betakes himself out into the wild, mountainous landscapes. And the district is so large for the few people—at the most 15-20 men assemble near the Killinek mission station—that no one is in another's way. They prefer to go alone or in pairs with the dog-sleds, with a young man along for assistance, in order to overtake the birds more quickly and to be able to take the bag home more conveniently. In the few days when the birds are present, a good hunter is often able to shoot several hundred. To be sure the hunt is strenuous. They travel across the wide, snowy landscape until they see a flock flying up somewhere. Sitting down they do not see the ptarmigan until rather near, as I convinced myself. The hunter now usually springs from the halting sled and approaches the birds in order to get one or two good shots at them. The unwounded birds rise at once and fly away, and it is now a matter of paying attention to where they stop again. After the game has been put on the sleds, they journey farther, seeking either the part of the flock which has flown away, or new bands. Now and then they see several at the same time, at other times they have to wait a long time before coming across a single one.

The flight lasts from one to three weeks. In autumn it is seldom so numerous, indeed, often quite insignificant. In the middle of September, 1905, countless flocks are said to have flown southward over Killinek. In 1906 the first ptarmigan were not observed until 28th September. From 4th October they appeared somewhat more numerously in a heavy, driving snow and some cold, but rather large hunting parties did not get many, particularly as they could not yet travel in the light fall of snow. Whether the unusually long and mild fall kept the birds in their northern dwelling places, or induced them to choose another migration route, must remain unknown. While I was in Labrador there were no *Niksartut* [Rock Ptarmigan] at the southern mission stations, and Missionary Perrett wrote me from Nain in March, 1907, that apparently none had been present on the coast through the whole winter. The migration thus apparently touched northeastern Labrador little in the year 1906.

With all the exertion, it is still a rare pleasure to go on the fall hunt on foot. The fine, whirling snow often drives into one's face sharp as needles, but it usually does not last long. Now the broad, mountainous landscape lies there still and in new, blinding purity, from which here and there

rise up the outlines of dark rocks and abruptly descending gorges. Attentively one strides over the mountains, and likes to walk in deep snow with the broad Canadian snowshoes, carefully cross the small valleys under whose thin coating of snow the well-known flat pond or swamp perhaps as yet keeps no fast winter's sleep. But suddenly one sees on the slope the tripartite tracks of ptarmigan, and looking about, there stands the whole flock, ten to twenty in number, as if rooted before you. Now one must slide quickly to the ground, and if there is no cover creep slowly forwards to get within shooting distance. If the ptarmigan are scarce, let one take care! With lightly ruffled, but always smooth plumage, the birds stand there, or perhaps trip about a few steps. These misty white forms, more shining than the newly-fallen snow, present a charming sight. Now you slowly seek your mark, if possible several of the creatures sitting close together, and then the shot rolls out over the lonely landscape, often re-echoing, while the prize lies stretched out, jerking its feet in the air and the survivors fly away terrified. Uusally all hasten in the same direction or collect again very soon.

Their flight is easy and rapid, but the first flight does not seem to be pleasant for them. Before alighting, they frequently soar for a long stretch. They can run quickly, without doing it often it is true, and with their long, broad claws (p. 371) scratch paths in the snow. They are said to discover very easily the places where under as thin a sheet of snow as possible, they find the shrub-like plants which make up their food. Instinctive experience may qualify them, perhaps not the sharpness of their sense of smell. The birds when shot bleed copiously and in spite of immediate cleaning with snow and bits of paper only a part of the birds is suitable for preparation. But the ones who have flown up have mostly not moved too far away, so that one may get a shot at them once more. Then they become more shy.

I heard only a few times a note uttered by birds driven up, namely, the deep, rough *Korr* of the male, as I heard it so plainly at the Icelandic breeding places of the bird. But these short, typical calls with their angry, whirring rattle have quite an appropriate effect in the midst of the deserted, endlessly still landscapes, in which at the most, the wind is heard with its wonderfully melodious or fearfully threatening voice, to lure forth the little hurrying Snow Buntings, Longspurs, and Redpolls, or near to dwellings of mankind a Raven utters his unpleasant, penetrating croak.

The flights of ptarmigan are accompanied by birds of prey; especially the proud Gyrfalcon, the smaller Duck Hawk, and the beautiful Snowy Owl follow them. If the flight is smaller, as in the autumn of 1906, then these birds are observed only in small numbers. In addition, foxes assemble, particularly *Vulpes lagopus* [Arctic Fox], in places where there are many ptarmigan, and all the other beasts of prey in like manner probably take a share at the appearance of our much-desired bird. But Nature replaces the destruction of countless numbers of these creatures in a satisfactory manner, and with the decline of the Eskimo population as well as the vigorous pursuit of the fur-bearing beasts of prey, the sad consequences of the introduction of firearms in the lands bordering our districts in the north might perhaps be reduced.[59]

Accipiter atricapillus (Wils.)[60] [p. 371]. *Schwarzkopfiger Habicht.*—AMERICAN GOSHAWK.

Eskimo: *Kigavik, -vîk, -vit* ? (*partim*).

Apparently a rare visitor of our district, probably mostly at the migration periods of the ptarmigan and other birds. According to Spreadborough, Packard, and others it does not breed until farther south in the wooded regions, in Ungava Bay (Macoun, II, p. 227); [p. 372] according to Missionary Perrett and others also on the east coast of Labrador. Farther northward, Kumlien gives the occurrence of a specimen on 19th September, 1877, in Cumberland Sound (1879, p. 82).

I have a juvenile female which was collected in the spring of 1901 a little southward from our district at Rama. Wing: 345 mm. Tail: 298. Bill, from the end of the cere: 23. Tarsi: 82. Middle toe including the 19 mm. long claw: 70 mm.

Archibuteo lagopus sancti-johannis (Gm.) [p. 732]. *Amerikanishcer Raubfuss-Bussard.*—ROUGH-LEGGED HAWK.

Eskimo: *Kennuajok* (*Kennajok*), *-jûk, -jut* (according to von Schubert = the imploring one; substantive form of *kennuvok* = he begs, implores; because the voice sounds so complaining and imploring).

Not rare visitor and sporadic breeding bird of our district. The Canadian *Neptune* Expedition in 1903 secured ten eggs of the species from Eskimos at Cape Chidley (Eifrig, 1905, p. 239); a young bird also came onto the steamer some miles away from this place in a thick fog, and he stayed for two days (Low, 1906, p. 318). The

[59] I have already published these notes on the Rock Ptarmigan in a similar description in the *Deutsche Jagerzeitung*, Neudamm, 1907, Vol. 50, p. 188 *et seq.*

[60] *Astur atricapillus atricapillus* (Wilson) of A.O.U. Check-List, 1910.—R.M.A.

Rough-legged Hawk often appears rather numerous in migration. It nests on steep islands and parts of the coast, but also on rocks in the interior. Farther to the south it becomes more abundant, especially in Ungava Bay, where it is said to occur rather generally on the south coast, which has abundant vegetation and birds in places. (Compare Macoun, II, p. 239.) I only twice observed some flying birds, on 6th and 16th of August, without getting a shot at them. Their food seems to consist especially of the rather numerous mice of the species *Peromyscus maniculatus* (Wagn.) [Hudsonian White-footed Mouse], and the not infrequent lemmings, *Dicrostonyx hudsonius* (Pall.)[61] [Labrador Banded Lemming]. In general the species does not seem to go beyond the borders of the forest, is also not mentioned for Baffin Island.

NOTE: Eagles (Eskimo: *Nektoralik, -lik, -ggit)* which have their breeding home elsewhere, are seldom seen in our district. For the strong-winged, powerful fliers it is certainly a small matter to lay considerable distances behind them even if the old pairs in general are resident birds, and only the young undertake rather long wanderings. Above all, it is not to be stated with certainty which species is in question.

Aquila chrysaëtos (L.) [Golden Eagle] is mentioned as not a rare breeding bird for the neighbourhood of Fort Chimo, Ungava Bay, (Macoun, II, p. 243).

Haliæetus leucocephalus alascans Towns. [Northern Bald Eagle] was likewise observed, apparently breeding in Ungava Bay (*l. c.*, p. 245). [p. 373].

Haliæetus albicilla (L.) [Gray Sea Eagle], on the other hand, is said to occur in Cumberland Sound, according to Kumlien's notes. He observed single birds there twice in October, 1877, and in the spring of 1878 a pair in an eyrie roost (1879, p. 82). This species, not rare in Greenland, is generally not mentioned west of Davis Strait. Yet it is difficult without further information, to dispute the statements made by Kumlien with complete positiveness, even if the investigator has also erred on other occasions. —In the first and last species it might be a case of distinct forms of our European birds.

Hierofalco gyrfalco obsoletus (Gm.)[62] [p. 373]. *Labrador Jagdfalke.*—BLACK GYRFALCON.

Eskimo: *Kigavik, -vîk, -vît (partim;* apparently from the voice).

According to my information at the spot and place the breeding birds of Labrador, at least of the wooded portion, all seem to be pretty uniformly dark and to justify the above subspecies. In our more restricted district, gyrfalcons breed on the whole rarely; in the interior of the country somewhat more numerously, it is said; in the south of Ungava Bay, on the other hand, rather abundantly according to Packard, Spreadborough and others (Macoun, II, p. 251).

The nomenclature, indeed, is so changeable with the different authors, that with my own insufficient observations, which forced me to trust provisionally to the information of the natives, I refrain from entering upon it closer. The Eskimos, moreover, often distinguish the Duck Hawk from the Gyrfalcon without applying distinct names to the two. In the case of all Gyrfalcon material from Labrador, as naturally out of most other districts, one must pay attention to the question whether they are breeding birds or visitors.

One may not look hastily upon all birds killed in summer as breeding birds. In this respect, only correctly labelled material can aid in the clearing up the conceptions about the Gyrfalcon forms. But for the present such material is present in quite insignificant numbers in scientific hands. Even the great series of skins of this species as the museums of Copenhagen and London possess, for example, are lacking in this respect. Age and sex of the birds must also naturally be taken into consideration. It is not sufficient to give a single measurement for male and female of the different subspecies, as Chapman does, for instance, in his Birds of Eastern North America, 1906, p. 208, particularly if the measurements are said to be distinguishing between the different subspecies.

According to my previous investigations on the species, I believe, however, that their correct separation into subspecies on the basis of sufficient series of breeding birds will not be quite so difficult or impossible, as one might suppose after the confusion of the present views. The material which I have secured from Iceland since 1903, for example, causes me to deviate more and more from my former viewpoint, in which I followed O. Kleinschmidt, and to regard the Icelandic breeding birds as not belonging together with the Greenlandic ones. (p. 374.).

Two Gyrfalcons which I observed in the middle of August south of Killinek in the interior of the country with my companion, but which we did not get a shot at, appeared very dark, I might say typical specimens of *H. g. obsoletus*. A. P. Low secured a specimen of this form at Cape Chidley (Townsend and Allen, 1907, p. 370). After the close of the breeding season the breeding birds do not seem to stray very far southward and like to hunt up wooded districts which have an abundance of ptarmigan and other birds of the grouse-like species.

Notes on the breeding of additional dark falcon forms, especially of *H. g. gyrfalco* (L.) [Gyrfalcon], in our district or in neighbouring localities, might apply to *H. g. obsoletus*. Besides, I also possess specimens of rather young *H. g. islandus* (Brünn.) [White Gyrfalcon] from Iceland, which in darkness of their plumage are scarcely inferior to *obsoletus* of Labrador, even if they seem to be

[61] According to the kind identification by Professor Matschie ox specimens brought by me.

[62] *Falco rusticolus obsoletus* Gmelin, of A.O.U. Check-List, 1910.—R.M.A.

browner. In spite of superficial similarity, one may not regard the breeding bird of Iceland, which perhaps leaves that place only in exceptional cases, as identical with Labrador breeding birds. Even without the provisional possibility of advancing conclusive diagnoses of the different forms, in a species of this kind, which is not only in places a resident bird in the broader sense, but also keeps to its breeding places with exceptional tenacity, one must indeed theoretically assume the genesis of geographical forms. And a separation into subspecies only purposes, indeed, to characterize the fine differences between the geographical representatives of one and the same species. That there are possibly geographical transition districts which are inhabited by intermediate forms is by no means improbable, but in spite of the great variability of this species, such intergradation is by no means a certainty as yet. Meanwhile, to separate the different forms specifically, I consider unjustified in the present state of our knowledge. The information concerning the breeding within our district of the two forms of the Gyrfalcon species considered by me, can not be brought up, before we are able to diagnose the forms with certainty.

Hierofalco gyrfalco candicans (Gm.[63] [p. 374]. *Weisser Jagdfalke*—WHITE GYRFALCON.

Eskimo: *Kigavik, -vîk, -vît* (partim).

This subspecies of the Gyrfalcon becomes considerably whiter than an Iceland breeding bird ever becomes, on which account I do not apply to it the name *H. g. islandus* Brünn. It most probably does not breed until northward of our district, but reaches it occasionally as a visitor and migrant. The birds, especially in autumn, regularly follow the flights of the ptarmigan which make their favourite food. However, they feed upon everything else possible, apparently not only on living creatures. The inhabitants not seldom find them during the winter in the baited fox-traps, by which the birds become annoying to them. (p. 375). These more or less light winter visitors and migrants are far more frequent than the dark breeding birds; indeed, in many years of abundant snow they are said to occur in rather large numbers. If R. Bell secured two specimens of "*Falco islandus*" (in flesh or skin?) in this region (Macoun, II, p. 248), and it was perhaps an instance of the above form, it is to be assumed that they were either non-breeding birds or skins from the winter. And when Low states (1906, p. 318) that the Canadian Neptune-Expedition had skins and eggs of *Falco islandus* Brünn. secured from the natives at Cape Chidley, it seems to me, quite aside from the correct identification, just as questionable, whether the eggs really belonged to the skins. Provisionally, I can not in the least believe in a breeding of "*Falco islandus*" or "*candicans*" in the wooded surroundings of Fort Chimo, in the south of Ungava Bay, of which different ones speak (compare Macoun, *l. c.*), although I do not consider it in any way improbable, that rather young individuals particularly, of this form, not yet arrived at the breeding age, range far around and may occasionally occur in summer in localities of the district in question which are rich in birds. Kumlien observed "*Falco candicans*" only once in Cumberland Sound and says that according to reports of the Eskimos the species was very rare in that place and was seen only now and then in winter (1879, p. 81).

I never observed the species at Killinek and only once on 22nd October, a very light specimen, white on the under side, at Okak. The falcon flew with its very characteristic flight, far more flapping than soaring, high in the sky, and hovered at last almost directly over me.

At this moment I sent a jacketed bullet at it. I saw some feathers fly about and the bird glided directly downward to a thickly grown wood on the far side of a lake. My search of an hour in the wild, snow-covered thicket was in vain, especially as I had no company, and tired out I returned to the mission station over icy slopes in the evening under the shining Northern Lights which were bright as moonlight.

A light female in my collection, with completely white under parts, collected at Rama in the fall of 1901, shows the following measurements: Wing: 414 mm. Tail: 265. Bill, from end of the cere: 27. Tarsi: 64. Middle toe including the 200 mm. long claw: 73 mm.

[63] *Falco islandus* Brünnich, of the A.O.U. Check-List, 1910.—R.M.A.

REPORT OF COUNCIL FOR 1928

DURING the past year ten meetings of Council were held, the average attendance at these meetings was 14 members or approximately 50 per cent of the membership of Council resident in Ottawa. At these meetings many items of business were discussed, the main discussions relating to the publishing of *The Canadian Field-Naturalist*, the official organ of the Club. Fortunately, this year the Publication Committee of Council, headed by Mr. Hoyes Lloyd, has been active and the January, March and December numbers were well illustrated. In the special March issue was published the essay by Dr. E. M.

Kindle on Canada North of 56°. In a Canadian-wide competition Dr. Kindle had been awarded first prize for this essay, consequently there has been an unusual demand for the number and 6,260 copies were printed, this being the largest issue ever printed of any number of *The Canadian Field-Naturalist*. The Club is grateful to Dr. Kindle for the privilege of publishing the essay and it has already been reprinted in the *Yale Review*, *Western Fur Trade*, *Western Mining Journal* and in part in a number of the leading daily papers of Western Canada.

A committee that has done good work for the Club is the Soirée Committee, of which Mr. P. A. Taverner is the Chairman. During the winter of 1928 three Old-time Soirées were held in the National Museum, at the first of these the speaker was Professor J. P. McMurrich, distinguished Anatomist of Toronto University. At the second Soirée the portrait of the late Dr. Fletcher was presented to the National Museum for keeping until a sutiable scientific building is built at the Experimental Farm. At this Siorée Dr. Kindle, Mr. Jenness, Mr. Taverner, Dr. Malte and Dr. Anderson gave short addresses on phases of their natural history observations of the summer of 1927. At the third Soirée the use of the microscope in natural history investigation was discussed and demonstrated. Following the educational programme refreshments were served and the social hour was much enjoyed by those present. These indoor meetings during the winter months supplement the annual outdoor excursions of the Club held each spring.

In retiring from office your Council feels that the past year has been on the whole a fairly successful one in the history of the Club. The financial position of the Club is fairly satisfactory, and it is hoped that the past support of the members will be continued even in greater measure to the new executive during the first year of the second half century of the Club.—J. F. WRIGHT, *Secretary*.

STATEMENT OF THE FINANCIAL STANDING OF THE OTTAWA FIELD NATURALISTS' CLUB AT THE CLOSE OF THE YEAR 1927-1928

ASSETS.		LIABILITIES	
Balance in Bank	$313.06	Graphic Publishers, Limited	$0.79
Unpaid membership dues, 1928	79.50	Surplus	522.42
Bills Receivable	130.65		
	$523.21		$523.21

RECEIPTS.		DISBURSEMENTS.	
By Balance in Bank	$96.82	Graphic Publishers Limited	$ 2,926.95
Membership Dues:—		Photogelatine Engraving Co., Ltd.	1,219.30
Current	1,024.30	The Mortimer Co. Limited	76.92
Arrears	33.50	Editor	140.00
Advances	10.25	Sundries	34.02
Affiliated Societies	60.15	Exchange	19.35
Advertisements	71.00		
Back Numbers, Illustrations, Reprints and Separates	3,083.41		
Donations	302.50		
Conversazione	47.67	Balance in Bank	313.06
	$4,729.60		$4,729.60

Audited and Found Correct:

(Signed) A. G. KINGSTON,
Auditor.

(Signed) BERTRAM A. FAUVEL.
Honorary Treasurer.

STATEMENT RESERVE FUND COMMITTEE

RECEIPTS.		DISBURSEMENTS.	
Cash on Hand, 1st January, 1928..	$389.74	Cash Balance.....	$556.64
Received from R. B. Whyte Estate..	100.00		
Received from R. B. Whyte Estate, final payment, Mrs. R. B. Whyte (deceased 15th August, 1928).....	33.33		
Interest from Bank.....	6.07		
Interest from Bond.....	27.50		
	$556.64		$556.64

ASSETS.

Balance in Bank.....	$556.64
Victory Bond, 1934.....	500.00
	$1,056.64

Audited and found correct:

(Signed) A. G. KINGSTON, Auditor.

(Signed) W. T. MACOUN, Chairman

NOTES AND OBSERVATIONS

A VISIT TO FLOWERPOT ISLAND.—From the village of Tobermory, which is situated at the north end of the Bruce Peninsula, "Flowerpot," as it is familiarly called, lies two miles east in the Georgian Bay. It is about two miles long, and nearly the same width, and the cliffs, which are usually twenty-five to a hundred feet from the water, are about two hundred feet in height.

Some thirty-five years ago Dr. P. J. Scott, Southampton, Ontario, told of finding *Asplenium Ruta-muraria* on this island and on September 2, 1928, a dream came true and the island was visited. The fern was found in splendid condition and in good quantity, growing on the fallen rocks at the base of the higher cliffs of the island, these rocks being thoroughly shaded by trees and covered with moss. The presence of *Pellæa gracilis* as well as *Asplenium Trichomanes* and *Asplenium viride* helped to make the visit enjoyable. The following list comprises all the ferns found on the island and they are mentioned in the order of their abundance:—

Cystopteris bulbifera
Asplenium Trichomanes
Cystopteris fragilis
Pellæa gracilis
Asplenium Ruta-muraria
Asplenium viride
Aspidium marginale
Botrychium virginianum
Aspidium spinulosum.

On the way home a visit was made to Owen Sound where we found the celebrities of that region—*Aspidium Filix-mas, A. Goldianum* and *Polystichum Lonchitis* as well as *Scolopendrium* growing in a small area near the city.—W. E. SAUNDERS.

MOURNING DOVES.—This year we had over 300 occupied Mourning Dove nests on our sanctuary at one time. Each nest raised from four to five broods. There were young half grown on the 14th day of April.

On several occasions I have analyzed the crops of adult Mourning Doves and have found several thousand weed seeds. A week ago I saw an immature Mourning Dove hit the telephone wires as it was flying in to roost. On picking it up I found its crop was full of small seeds, so I at once mailed it to The Royal Ontario Museum of Zoology, where Mr. L. L. Snyder and his associates examined its crop and it was found to contain 8,533 seeds of the Three-seeded Mercury, *Acalypha virginica*, a common weed of the farm land of Essex County—30 seeds of ragweed and 3 small bits of gravel.

There is no question about the good of the Mourning Dove, but imagine the number of weed seeds that would be destroyed per year by these 300 adult pairs and the young produced by them this year on the sanctuary.—MANLY F. MINER.

A LARGE FLOCK OF STARLINGS.—On September 5, 1928, while driving along a road about four miles south of Perth, Lanark county, Ontario, the writer saw a very large, compact flock of Starlings, which was estimated to contain approximately 500 birds. They arose from the roadside and settled on a nearby field in characteristic Starling fashion, at the same time emitting their harsh notes, which can hardly be termed musical when given *en masse* by such a number of birds. Flocks of this size, in Ontario at least, are not often seen,[1] consequently this note may be of interest for future reference. It might also be of value to mention the fact that the above were the only Starlings to be seen during our drive from Ottawa to Toronto on the above date. On the trip to Ottawa on September 1, only 5 Starlings were noticed, at Newtonville, 60 miles east of Toronto.—JAS. L. BAILLIE, JR., Toronto.

[1] *Can. Field-Naturalist*, Oct. 1928, p. 177.

NOTE ON THE CERULEAN WARBLER.—It might be of interest to your readers to learn that I found a Cerulean Warbler breeding at Delta, Ontario, which is 35 miles northeast of Kingston.

On June 8th last, and for three weeks following, I saw the male bird frequently, singing and feeding in the tops of very high trees and on one occasion it alighted on the ground only a few feet in front of me having got into a quarrel with another Warbler which brought them right down in front of me for a moment, allowing me to identify the bird without question.—C. L. BROLEY.

WASPS OCCUPY A HOUSE WREN BOX.—A Wren's house was placed on a tree in a garden in the spring of 1926, and shortly afterwards a pair of Wrens inspected, and finally decided to occupy, it. Perhaps this house was so readily taken because the roof was covered with a material called "Ready Roofing" which made it look old and weather beaten.

The following summer, Wrens were noticed making several attempts to enter this same house, but were never seen to get further than the door. They would go to the entrance and fly to the roof or a nearby branch, making a great clatter, and they seemed to be very much agitated. These actions kept up for a few days when, to the surprise of the observers, the birds left and did not return again during the summer. Swallows were also seen looking in to the house, but it was believed that the size of the hole prevented them from entering. Nothing more was thought of these incidents until late in October, 1927, when the house had to be removed because the tree was being cut down. Then the real reason for this house not being occupied was discovered. Wasps had built a nest in it, completely filling the box from entrance to roof. No wonder that the birds would not enter, as no doubt, like human beings, they hate to be "stung".—(Miss) LULU KEALY.

BOOK REVIEWS

VERTEBRATE ZOOLOGY: *An Introduction to the Comparative Anatomy, Embryology and Evolution of Chordate Animals. By G. R. de Beer, with an Introduction by Julian S. Huxley (Sedgwick & Jackson, Ltd.) 1928.*

The leading facts of vertebrate morphology are presented in an attractive and original style by Mr. de Beer who has deftly executed most of the illustrations (of which there are nearly two hundred) from dissections and laboratory preparations. This volume of five hundred pages is one of a series of text-books of animal biology edited by Professor Julian Huxley, one aim of which is to correlate the structure of parts with their function more than has been done in the past in text-books of equally moderate dimensions. Naturally the greater part of the contents of the book concerns the four-footed animals or Tetrapoda. This is a branch of the subject where several points of contact can be established with field natural history since the elusive property of biotaxis, which includes accommodation and apaptation, is as operative inside the body of an organism as it is outside. One example may be cited in this connexion. In the chapter of the newt, Mr. de Beer says that the possession of typically 5-fingered limbs is a sure criterion of a terrestrial animal, or of one whose ancestors were terrestrial. Now within the confines of Canada there occurs a remarkable species which has been regarded as the most primitive of existing tetrapods, namely, the "Mud Puppy" (*Necturus maculosus*). It is found in the River St. Lawrence and its tributaries above the city of Quebec. This aquatic salamander never leaves the water although it has fore-limbs and hind-limbs terminated by digits reduced to four in

number instead of five. These limbs are useless on land and are folded back upon the body when Necturus is swimming rapidly. They are employed in walking upon the bottom in shallow water. Exposure to dry air is quickly fatal to Necturus and when forcibly removed from the water, or if it should escape from its tank, it is a pitiful object; though highly interesting in its proper medium with its richly hued roseate gills beating rhythmically at intervals. This instance is enough to show that even an apparently sane and simple morphological deduction is not so much a matter-of-course as it might appear to be.—A. WILLEY.

SCIENTIFIC NATURAL HISTORY.—There are many indications that the outdoor study of living animals is beginning to be taken more and more seriously by zoolgists. Of this tendency the recent publication (Macmillan 1927) of a book on the subject of Animal Ecology by Charles Elton of the University Museum, Oxford, is a striking example. Ecology, as this author remarks, is a new name for a very old subject. It simply means scientific natural history, he says. Too often the subject has been treated in a way that almost justifies the statement that "ecology consists in saying what every one knows in language that nobody can understand." The present book is a welcome relief from such a method of treatment. After reading it one is ready to agree with Julian Huxley, who in the Introduction says of Mr. Elton that, "He is finally fortunate in having an original mind, one which refuses to go on looking at a subject in the traditional way just because it has always been looked at in that way. The result, it appeared to me as I read through his manuscript, is an illuminating and original book, the first in which the proper point of view of animal ecology has yet been explicitly stated."

Two or three passages will illustrate something of his point of view. "Ecology is a branch of zoology which is perhaps more able to offer immediate practical help to mankind than any of the others." ". . . that the discoveries of Darwin, himself a magnificent field naturalist, had the remarkable effect of sending the whole zoological world flocking indoors, where they remained hard at work for fifty years or more, and whence they are now beginning to put forth cautious heads again into the open air."

"It should be remembered that the professional ecologist has to rely, and always will have to rely, for a great many of his data upon the observations of men like fishermen, gamekeepers, local naturalists and, in fact, all manner of people who are not professional scientists at all. . . . The writer has learnt a far greater number of interesting and invaluable ecological facts about the social organization of animals from gamekeepers and private naturalists and from the writings of men like W. H. Hudson, than from trained zoologists. There is something to be said for the view of an anonymous writer in *Nature*, who wrote: "The notion that the truth can be sought in books is still widely prevalent and the present dearth of illiterate men constitutes a serious menace to the advancement of knowledge." Even if this is so, it is at the same time true that there is more ecology in the Old Testament or the plays of Shakespeare than in most of the zoloogical text books ever published!"

The principles of ecology such as the distribution of animal communities, ecological succession, environmental factors, the animal communities, variations in the numbers of animals, etc., are illustrated by a wealth of examples which will suggest many lines of inquiry to the more serious field naturalist. Expecially valuable to the working naturalist is the chapter on methods.

The following passage will serve to illustrate the importance to be placed on the publication of such notes and observations as find a place in the pages of this journal. "It is on such facts as these that our knowledge of animal dispersal will always have to be built up, facts which are usually encountered by accident, in a casual way, and often in cricumstances which make it impossible to follow up the problem any further. It is therefore especially desirable to publish such notes on dispersal, however, fragmentary they may be, since there is not usually much chance of getting better ones for some years. And it may be noted there that there is a certain reluctance among zoologists to publish incomplete observations, which is quite justifiable in the case of definite experiments, or of the descriptions of dead structures which will wait for you to observe them completely, and which can be checked by other observers if they are sufficiently interested.

But in accumulating the life-history records of wild animals it is essential to publish any tiny fact about them which seems unlikely to be encountered in the near future, or which helps to provide another piece in the complete jigg-saw puzzle which ecologists spend their time putting together."

Naturalists in general should find this book absorbingly interesting.—J.R.D.

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CONTENTS

PAGE

Sedimentary Record in the Rocky Mountains at about the 51st Parallel. By P. S. Warren 23
Random Notes on the Insects of the Rainy River District. By J. F. Brimley 27
Hemiptera Found in the Rainy River District. By J. F. Brimley 28
Migration of Western Plants to Toronto Region. By Stuart L. Thompson 30
Contribution to the Knowledge of the Avifauna of North-Eastern Labrador. By Bernhard Hantzsch 31
Christmas Bird Census, 1928 34

Notes and Observations:—
Bird Migration at Vineland Station. By Geo. H. Dickson 38
A Novel Bird-banding Note. By W. Philip Gerald 39
A Chickadee-Grouse Alliance. By Napier Smith 39
Occurrence of the Great Grey Owl in the Montreal District. By Napier Smith 40
Mockingbird Winters at Hamilton, Ontario. By Geo. McMillan 41
Some Measurements of the Common Crow. By L. L. Snyder 41
The Smoky Shrew at London, Ontario. By W. E. Saunders 42
Brewer Mole in Ontario. By W. E. Saunders 42
Mallards Tardy in Migrating. By A. G. Lawrence 42
Occurrence of the European Starling at Petit Rocher, N.B. By Harrison F. Lewis 42

Official Canadian Record of Bird-banding Returns 42

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SEDIMENTARY RECORD IN THE ROCKY MOUNTAINS AT ABOUT THE 51st PARALLEL

By P. S. WARREN

University of Alberta, Edmonton, Alberta.

Introduction

THIS PAPER is not written with the idea of introducing new geological data but more with the intention of summing up what has been studied and recorded in the section across the Rockies at about the 51st Parallel. It has long been known that this section comprises a fairly complete sequence of Precambrian, Palæozoic and Mesozoic strata, but it has not been till comparatively recently that various areas have been studied in sufficient detail to demonstrate the completeness of the sedimentary record in this part of the Rocky mountains. At the present time it is not the intention to deal with stratigraphic problems to any great extent but rather to study the section with a view to demonstrating the completeness of the record of the sedimentary rocks.

Previous Workers

Our knowledge of the geology of this area dates back to 1886, when McConnell made his well-known section through the mountains at about the 51st Parallel[1]. Other geologists followed, either studying certain problems or limiting themselves to definite areas. Chief among these may be mentioned Dowling, who confined his attention to the eastern ranges and especially to the coal-bearing beds of the Cascade valley;[2] Allan, who studied the Field map-area[3] and later the complete section;[4] and Walcott, who spent several years studying the older formations, especially the Cambrian.[5] Later work was undertaken by Walker in the Windermere area,[6] Shimer in the Lake Minnewanka area,[7] and Warren in the Banff area.[8] The statements in this paper will be based largely on the results obtained by these various workers.

The Geological Succession

The complete succession of rocks as developed in the section across the cordillera is not displayed in any one area. The reason for this is two-fold. Firstly, the uplift has been differential, the central and western portion of the mountains having been raised to a greater height and displaying much older rocks than those exposed on either flank. This central belt is known as "the old Rockies". It lies closer to the western flank, leaving the best exposures of the younger rocks on the eastern flank. Secondly, the sea-way which occupied the Rocky Mountain geosyncline so continuously throughout geological time prior to the uplift of the mountains apparently did not always cover the same part of the trough. Sometimes the sea-way was much confined; at other times it was widely spread. Walcott has attempted to show the presence of subsidiary troughs in the geosyncline, sometimes with deposits of contemporary beds of different lithological characteristics and containing distinct faunas.[9] Such study is outside the scope of the present paper, in which the writer will be content to consider the best developed section of any group of beds irrespective of their geographical position.

The lowest beds exposed in the section under review are considered Precambrian in age by Walcott.[10] This writer divides the Precambrian into two formations—Corral Creek formation of sandstone with the base not exposed overlain by the Hector formation, which is predominantly shale. Walcott gives the total thickness of the two formations as 2,622 feet. Allan, in the Field map-area, gives a much greater thickness, 5,910 feet.[11] Great as this thickness is, it can

[1]Geol. Surv., Can., Ann. Rept., Vol. II, 1887.
[2]Geol. Surv., Can., Pub. No. 949, 1907.
[3]Geol. Sur., Can., Mem. 55, 1914.
[4]Geol. Surv., Can., Guide Book No. 8, Part II, 1913.
[5]Smith. Misc. Coll., Camb. Geol. and Pal., Various papers, 1908 to 1927.
[6]Geol. Surv., Can., Mem. 148, 1926.
[7]Geol. Surv., Can., Bulletin 42, pp. 1-84, 1926.
[8]Geol. Surv., Can., Mem. 153, 1927.
[9]Smith. Misc. Coll., 1927, Camb. Geol. and Pal., Vol. 75, No. 4.
[10]Pre-Cambrian Rocks of the Bow River Valley, Alberta, Canada. Smith. Misc. Coll., Vol. 53, No. 7, 1910.
[11]Geol. Surv., Can., Mem. No. 55, p. 60, 1914.

only represent a small portion of the Precambrian as compared with the exposures on some other areas. In the Selkirk mountains immediately to the west Daly records a section of Precambrian rocks 61,150 feet thick.[12] The Precambrian rocks in our section, therefore, must be considered as incompletely represented.

The first break in the sedimentary record in this section is at the top of the Precambrian rocks. This break is well defined in the area along the Bow valley, where the lowest Cambrian sediments, a conglomerate up to 300 feet in thickness, rest unconformably on the Hector formation. The extent of time represented by this unconformity cannot be gauged with any degree of accuracy, as it was apparently continent-wide. Walcott states "Everywhere there is a stratigraphic and time break between the known Pre-Cambrian rocks and Cambrian sediments of the North American continent.[13] It is customary to consider this break of major importance on account of the abrupt appearance of the *Olenellus* fauna in the Lower Cambrian. This phenomenon, however, is open to various interpretations and it is quite possible that the stratigraphic break at this time may have been of very short duration.

The Precambrian rocks are followed in the section by a very fine succession of Cambrian strata. The significance of this succession is its completeness. The Lower Cambrian, represented by the Fairview, Lake Louise, St. Piran and Mt. Whyte formations, grades into the Middle Cambrian, represented by the Ptarmigan, Cathedral, Stephen and Eldon formations, which is overlain conformably by the Upper Cambrian, composed of the Bosworth, Paget and Sherbrooke formations of the Mt. Bosworth section. Higher Cambrian beds occur in the ranges farther to the west. Allan described several formations in this area, namely the Chancellor shale, Ottertail limestone and Goodsir shale.[14] It was originally considered by workers in this area that the Chancellor shale overlay the Sherbrooke. Walcott considers now that part of the Chancellor shale may represent part or all of the Upper Cambrian succession of the Mt. Bosworth section.[15] Allan now contends[16] that the lower beds of the Chancellor shale represent the Sherbrooke formation. A careful examination of the boundary between the two formations as shown on Allan's map[17] certainly bears out his contention and the writer proposes to consider his finding as correct.

The upper boundary of the Cambrian in this section has proved difficult of determination. Originally the Goodsir shale was considered to contain an Ordovician fauna.[18] Now it is known that most of the Goodsir is of Upper Cambrian age. Walker, in the Windermere area, finds an Upper Cambrian (Ozarkian) fauna throughout most of the formation.[19] At the top of the formation he obtained a fauna which Ulrich considers is representative of the *Ceratopyge* zone[20] of the lowermost Ordovician. Walker also states that the *Ceratopyge* fauna collected by Shepard[21] and described by Raymond[22] apparently comes from a similar horizon. It seems evident, therefore, that the boundary between the Cambrian and Ordovician must be placed almost at the top of the Goodsir shale. Such an interpretation is borne out by the fact that the shale beds conformably overlying the Goodsir formation contain a graptolite fauna representative of the lowermost zone of the Deepkill shale (Lower Ordovician) of New York state.

The Cambrian system of rocks exposed in this section is unusually complete, there being not a single sedimentary break in the succession so far as known at present. The total thickness of the Cambrian is about 23,200 feet.[23] Of this total about 14,400 feet is included in the Upper Cambrian, including the Bosworth and Paget formations, Sherbrooke-Chancellor group, Ottertail limestone and most of the Goodsir shale. This very fine section of Upper Cambrian, the thickest known in North America, seems well deserving of a series name and the term *Fieldian* is hereby suggested for it, the name being derived from the town of Field in that immediate neighbourhood.

The Goodsir shale is overlain, apparently conformably, by the Glenogle shale.[24] These are the Graptolite shales of McConnell and of Allan.[25] Collections of graptolites from this formation indicate the presence of three Deepkill zones of New York State and a higher zone between the Deepkill and Normanskill shales.[26] The higher zone appears to be represented only

[12] A Geological Reconnaissance between Golden and Kamloops, B.C., along the Canadian Pacific Railway. Geol. Surv., Can., Mem. No. 68, 1915.
[13] Smith. Misc. Coll., Vol. 57, No. 1, p. 12.
[14] Geol. Surv., Can., Mem. 55, 1914.
[15] Smith. Misc. Coll., Vol. 75, No. 4.
[16] Personal communication.
[17] Geol. Surv., Can., Mem. 55, 1914, Map 142A.
[18] Walcott, C. D., Smith. Misc. Coll., Vol. 57, No. 7, 1912.
[19] Geol. Surv., Can., Mem. 148, 1926, pp. 22-23.
[20] *Loc. cit.*, p. 23.
[21] Jour. of Geol., Vol. 30, 1922, pp. 361-376.
[22] Amer. Jour. Sci., Fifth Ser., Vol. 3, 1922, p. 204.
[23] Allan's figures, Geol. Surv., Can., Mem. 55, p 60.
[24] Burling, L. D., Geol. Mag., Vol. LIX, 1923, p. 456.
[25] McConnell, R. G., Geol. Surv. Can., Ann. Rept., 1886, Pt. D., p. 22; Allan, J. A., Geol. Surv., Can., Mem. 55, 1914, p. 100.
[26] Walker, J. F., Geol. Surv., Can., Mem. 148, 1926, pp. 24-31.

in the neighbourhood of Glenogle. The formation embraces, therefore, the Lower Ordovician (Beckmantown) and part of the Middle Ordovician (Chazy). Walker considers that the overlying Wonah quartzite rests disconformably on the Glenogle shale and that they are separated by a considerable time interval.[27] If so, it is very probable that a considerable thickness of the Glenogle shale has been eroded before the deposition of the later beds. It is quite possible that most of the Middle Ordovician was deposited and that the sea retreated at the end of that time.

The Wonah quartzite[28] which overlies the Glenogle shale was originally included in the *Halysites* beds of McConnell and of Allan. It is overlain conformably by beds of Richmond age and this formation would seem to approximate that time very closely. Taking for granted a Lower Richmond age for the formation, as postulated by Walcott,[29] there is a considerable stratigraphic break in the succession, part of the Middle and part of the Upper Ordovician being absent. This is the second period of non-deposition in the section and corresponds to quite a wide retreat of the sea over the North American continent, as postulated by Ulrich.[30]

The Wonah quartzite is overlain by the Beaverfoot formation,[31] originally part of the *Halysites* beds. The formation contains a Richmond fauna lately studied by Wilson.[32] In the Sinclair Canyon section it comprises about 400 feet of dolomitic limestones, according to Walcott.[33]

The Ordovician in this section embraces, therefore, the uppermost beds of the Goodsir shale, the Glenogle shale with a thickness of at least 2,200 feet, the Wonah quartzite, 167 feet and the Beaverfoot formation about 400 feet thick, a total thickness of about 2,800 feet with the upper part of the Middle and the lower part the Upper Ordovician missing.

The Silurian in this section is represented by the upper part of the *Halysites* beds, now known as the Brisco formation.[34] This formation lies quite conformably upon the Beaverfoot without any sign of stratigraphic break and is composed of much the same type of rock. In the lowest beds in the formation Walcott reports[35] *Pentamerus* and *Virgiana*, the latter fossil being characteristic of the lowest Silurian in western North America. It would appear, therefore, that there is no break in the succession between the Ordovician and Silurian in this section, using these terms in the generally accepted way.

About 300 feet from the base of the formation Walcott reports graptolites, which Ruedemann considers are of Clinton age.[36] Near the top of the formation other Silurian fossils occur which have not yet been fully studied and their exact age is not known. Considering, however, that the formation is estimated to be 1,200 feet thick (Walcott) it seems reasonable to consider that all or most of the Middle Silurian is present. It is very doubtful, however, if any Upper Silurian is represented in the section.

The Devonian is not well represented in the western ranges of the Rockies. It is necessary, therefore, to transfer our attention to the eastern ranges to complete the section. The lowest Devonian beds recognized in this part of the section are believed to be Middle Devonian in age, the Lower Devonian being absent. There is, therefore, a considerable break in the sequence at this time, since no Upper Silurian or Lower Devonian beds are present. This is known to be a period of very confined sea-ways on the North American continent and it is therefore not surprising to find these beds missing in the section. This constitutes a third break in the succession.

The Devonian is represented in the front ranges by two formations; the Ghost River formation, comprising about 300 feet of quartzite and dolomite; the Minnewanka formation[37] (lower part) represented by 1,900 feet of usually thin-bedded limestone and dolomite; and the Minnewanka formation (upper part), consisting of massive limestone and dolomites to a thickness of 1,000 feet.[38] The upper part of the Minnewanka carries an Upper Devonian fauna. A Middle Devonian fauna has been collected from some of the beds in the lower part of the formation. The Ghost River formation has, so far, proved unfossiliferous but it is probably Middle Devonian in age. The total thickness of Devonian in the Banff area is 3,200 feet and there appears to be no break in the succession.

The Minnewanka limestone is overlain by the

[27] *Loc. cit.*, p. 31.
[28] Walcott, C. D., Smith. Misc. Coll., Vol. 75, No. 1, 1924, p. 49
[29] Smith. Misc. Coll., Vol. 75, No. 1, 1924, p. 43.
[30] The Ordovician-Silurian Boundary, Congrs. Geol. Int., Compte-Rendu de la XIIIe Session, Toronto, 1913, pp. 593-667.
[31] Burling, L. D., Geol. Mag., Vol. LIX, 1922, p. 459.
[32] Geol. Surv., Can., Bull. 44, 1926, pp. 1-34.
[33] *Loc. cit.*, p. 13.
[34] Walcott, C. D., Smith. Misc. Coll., Vol. 75, No. 1, 1924, p. 11.
[35] *Loc. cit.*, p. 11.
[36] *Loc. cit.*, p. 12.
[37] For a comparison of the original nomenclature of formations in the front ranges with the new, see Kindle, E. M., Standard Palaeozoic Section of Rocky Mountains near Banff, Alberta. Pan-American Geologist, Vol. XLII, Sept., 1924, pp. 113-124.
[38] Warren, P. S., Banff Area, Alberta. Geol. Surv., Can., Mem. 153, 1927.

Banff formation. The lower beds of this formation are black, fissile shales. No identifiable fossils were collected from these shales in the Banff area. Abut 300 feet from the bottom of the formation the shales become calcareous and a Kinderhook fauna appears. The age of the black shale beds is therefore left in doubt. In his report on the Banff area the writer included these beds with the Carboniferous on physical evidence, because the change from the heavy limestones of the Minnewanka below to the black shale is very abrupt, whereas there is a gradation between the black shales and the calcareous beds holding the Kinderhook fauna. In other parts of the Rockies the writer has since collected a Devonian fauna, exclusive of any Carboniferous species, from the lower part of these shales. The boundary between the Devonian and the Carboniferous, therefore, lies within the black shale beds. This point is rather significant from one aspect. The change from the Minnewanka limestone to the black shale is very abrupt and would lead to the suggestion of a stratigraphic break in the succession. No evidence in the field, however, could be obtained to show an unconformity and the identical fauna present in the upper beds of the Minnewanka limestone occurring also in the lower beds of the shale would mitigate against any such interpretation. The black shale beds are believed to be merely the reflection of diastrophic movements in the vicinity without causing the withdrawal of the sea.

The Carboniferous system is represented by three formations. The lowest of these, the Banff formation, including shales and argillaceous limestones, is 1,400 feet thick in the Banff area. It is overlain by the Rundle limestone consisting of 2,400 feet of heavy limestones, often cherty. The upper formation, the Rocky Mountain quartzite, comprises dolomites, arenaceous beds and chert to a thickness of about 700 feet. In the very upper part accurs a thin phosphate bed. The Banff formation and most, if not all, of the Rundle limestone are Mississippian in age. The Rocky Mountain quartzite is Pennsylvania though the very uppermost beds, including the phosphate bed, may be Permian. We have, therefore, a total thickness of about 4,500 feet of Carboniferous rocks in this section without any stratigraphic break, the boundaries between the formations in each case being gradational.

A disconformity occurs at the top of the Rocky Mountain quartzite and most, or all, of the Permian is missing from the section. This is the fourth break in the succession and it again marks a time of positive diastrophism on the North American continent. There appear to have been no orogenic movements in this area as the overlying Triassic beds show a dip quite conformable with the beds of the underlying Rocky Mountain quartzite.

The Mesozoic rock sequence is not nearly so complete as the Palæozoic. The Triassic is represented in the eastern ranges by the Spray River formation. This formation is composed essentially of fine-grained limestones, dolomites and shales to a thickness of about 3,500 feet. So far as can be deduced from palæontological evidence, only the Lower Triassic is represented. Upper Triassic beds are present in the northern part of the Rockies but so far, they have not been reported south of Peace river. This is the fifth break in the succession.

Lying with conformable dip upon the Spray River formation is the Fernie shale. The Fernie is Jurassic in age but its horizon within the system seems to vary in different places. Collections obtained from the formation in the neighbourhood of Lake Minnewanka are considered by McLearn to represent a Lower Middle Jurassic age.[39] More recent collecting by the author in this region seems to point to the presence of an Upper Jurassic horizon also. The total thickness of the formation is 1,600 feet,[40] and as there is no break in the sequence and the Jurassic beds grade upward into the coal-bearing beds above, it seems reasonable to assume that all the Middle and Upper Jurassic is present in the section.

The youngest beds represented in our section are the Lower Cretaceous coal-bearing beds of the Cascade valley. They lie conformably on the Fernie shale and the lower part of the series may be marine. Dowling divided these beds into three formations, the Lower Ribboned sandstone, the Coal measures and the Upper Ribboned sandstone.[41] The total thickness of the beds is over 4,000 feet. The age of the coal-bearing beds is generally considered to be Barremian.[42]

Although these are the youngest beds now present in this part of the mountains, it is very probable that the area was invaded by the sea in Upper Cretaceous time, especially in Colorado time. This sea formed deposits of shale up to 3,000 feet in thickness in the foothills just east of the mountains and there is no evidence that shore-line conditions prevailed there so the sea must have extended still farther to the west and

[39]McLearn, F. H., Geol. Surv. Can., Sum. Rept., 1922, Pt. B., p. 6

[40]Dowling, D. B., Geol. Surv., Can., 1997, Pub. No. 949 p. 9.

[41]Dowling, D. B., Geo. Surv., Can., 1907, Pub. No. 949, p. 8.

[42]Berry, E. W., Maryland Geol. Surv., Lower Cret., 1911, p. 172.

covered the area now embraced in the Rocky mountains. All evidence of the beds laid down by this sea in the mountains, however, has been removed.

SUMMARY

The section across the Rockies about the 51st Parallel shows a remarkably complete sequence of rocks from the Precambrian to the Lower Cretaceous. Various horizons are missing from the section, including a gap at the top of the Precambrian, part of the Middle and part of the Upper Ordovician, the Permian, the Middle and Upper Triassic and the Lower Jurassic. Some of the sections are especially fine, including the Cambrian and the lower part of the Ordovician, with no break between the systems, and the Middle and Upper Devonian, and the Carboniferous with no break in the succession. The sections of the upper part of the Ordovician and the Lower and Middle Silurian laid down in one sedimentary series should also be mentioned.

RANDOM NOTES ON THE INSECTS OF THE RAINY RIVER DISTRICT

By J. F. BRIMLEY, Wellington, Ont.

DURING the year 1924 the writer was resident in the Rainy River District, and the time that could be spared from other duties was given to the collecting of the various forms of insect life found there.

The chief collecting was in the neighbourhood of Emo, situated on the Rainy River; but excursions were made to points ranging from Fort Frances to Lake of the Woods, and to Off Lake and other sections in a northerly direction.

Forest fires that have passed through the district during the past few years have undoubtedly had effect on the fauna, but game is still plentiful. The blackened timber serves as good protection to *Iphthimus opacus* Lec. a tenebrionid which so resembles it in colour that close searching was needed to detect it.

On arrival in April the weather was cold and considerable snow still around, but in spite of this, numbers of the cicadellid *Oncometopia lateralis* Fab. had gathered in the sunny spots. Towards the end of the month it was possible to commence sifting, which process continued during May yielded numbers of coleoptera and hemiptera, the former chiefly carabidæ, staphylimidæ and lathridiidæ.

As soon as the leaves began to show, sifting was discontinued and the tray used for beating. From then on throughout the summer each day brought forth fresh captures. Only the amateur entomologist knows the thrill experienced when a specimen of *Ludius appressa* Rand. settled on my coat, followed by another alighting on the tray a few minutes later; or when by a stroke of the cane *Ludius splendens* Zieg., drops into sight. I found elateridæ extremely plentiful, some species being so numerous that it became monotonous at times shaking them from the tray. Among these were *Agriotes limosus* Lec., *A. fucsosus* Lec., *Ludius triundulatus* Rand. and *L. hierglypticus* Say.

Around the sloughs a more varied vegetation was to be found than in the wooded sections. Along the banks were masses of vetch and briar in bloom, in the latter *Trichiatinus affinio* G.P. and *Conotelus obscurus* Er. were feeding. A pair of the clearwing moth, *Bembecia marginata* Harr. was taken from raspberry canes. At the bottom, the catstails, sedges and other plants, usually found near water, yielded numbers of *Donacia*, *Dorytomus*, and other semi-aquatic forms. Here also the tortoise beetles, *Chelymorpha cassidea* Fab., *Chirida guthata* Oliv., and *Metriona bicolor* Fab. were found feeding on the wild morning glory.

The Manitou reserve, one of the Indian reserves in the district, had escaped the full ravages of fire and here was an ideal collecting ground. Crossed in different directions by tracks and winter roads studded with dandelions, nearly every blossom carried a number of *Anthaxai æneogaster* Cast., whilst the bloom of wild strawberry was the hiding place of *Anthobium horni* Fauv. and *A. pothos* Mann, the former being the most common. The plum curculis, *Conotrachelus nenuphar* Hbst., and numbers of clicks were beaten from the wild plum which was abundant in parts of the reserve.

Early in the season our old acquaintances, the mourning cloak, *Aglais antiopa* L., the comma, *Polygonia progne* Cram., and the spring azure were out—the heralds of a host of their kind that later sported along the paths.

As the season advanced, the vegetation became more abundant, the blossoms enticing fresh families of insects, such as cerambycidæ, mordellidæ, and cantharidæ. *Evodinus monticola* Rand., *Paralellus subargentata* Kby., *Strangalepta pubera* Say, *Leptura nigrella* Say. *L. chrysocoma*

Kby., *L. luridipennis* Hald., and *Bellamira scalaris* Say., being prominent amongst the former. The swallowtail butterfly, *Papilio glaucus* L., was seen. The crescent spots, *Phyciodes nycteis* D. & H., and *P. tharos* Dru., with the copper *Heodes thoe* Bdv., rambled leisurely along, whilst skippers sported together, among them being *Amblycistes vialis* Edv., *A. hegon* Scud., *Carterocephalus palæmon* Pall., *Pamphila leonardus* Harr., *Cocceius pylades* Scud., and *Poanes zabulon* Bdv. & Lec. The humming-bird hawkmoths, *Hæmorrhagia thyobe* Fab., and *H. diffinis* Bdv., were rather plentiful dashing up in a great hurry to partake of the sweets offered, and then off again without alighting. One looked in vain for the monarch butterfly, the common summer visitor to eastern Ontario, but two were seen at the school fair that had been taken by the children.

A fascinating sight at night during July and August was the immense numbers of fireflies, mostly *Photuris pennsylvanica* D. & G., other species also present were *Photinus ardens* Lec. and *Pyractomena lucifer* Melsh.

The large number of galls on the stems of golden rod, also, attracted attention. In some places, almost every stem had one or two of the globular bulbs. Some of these were gathered, and from them emerged the following year, *Trypeta solidaginis*.

From a species of briar other galls were taken which produced a number of cynipids, their parasites, and finally about two months later, two specimens of *Isohydnocera tabida* Lec., which no doubt were predatory on the other inhabitants. This species and *Hydnocera humeralis* Say. was abundant from June until August. Another handsome clerid taken several times was *Enoclerus ichneumoneus* Fab. *Chariessa pilosa* Forst. was active on piles of cottonwood, as was also *Saperda calcarata* Say.

It was very amusing, though perhaps not from the entomologists' point of view, to watch the English sparrows waiting on the wires and buildings near these piles of cordwood, for insects to settle. *Dicerca prolongata* Lec. seemed to be the most frequent visitor, and as soon as one settled down would swoop a sparrow, and usually depart with a choice tit-bit. No doubt many an entomological rarity came to an end in this way.

Along the river are numerous logs that have drifted ashore during the spring floods, and have been left high and dry when the water lowered. Under the bark were found colonies of *Tachyta nana* Gyll. and *Anthicus formicarius* Laf. A number of *Pytho planus* Oliv. emerged from pupae taken from these logs. Cicindelidæ was very active on the stretches of sand, several species being taken, among them being *C. repanda* Dej., *C. longilabris* Say, and *C. purpurea* Oliv. No systematic collecting of lepidoptera was undertaken, the chief attention being given to the coleoptera and hemiptera, but *Smerinthus jamaciensis* Dru. was shaken onto the tray whilst beating, a number of times. *Pachysphin modesta* Har. emerged from a pupa found in a rotten log. *Telea polyphemus* Cram. was very common. In addition to those mentioned the following species were also taken.

Pieris rapæ L.; *Thanaos brizo* Bdv & Lec.; *Polygonia progne* Cram.; *Sphinx kalmiæ* A.& S.; *Chenucha virginica* Chorp.; *Phragmatobia fuliginosus* L.; *Isia isabella* A. & S.; *Hyphantria cunea* Dru.; *Alypia langtoni* Coup.; *Feltia subgothica* Harv.; *Feltia volubilis* Harv.; *Agrotis collaris* G. & R.; *Agrotis fennica* Tau.; *Lycophalia occulta* L.; *Polia adjuncta* Bdv.; *Morrisonia vomerina* Grate; *Xanthia lutea* Strom.; *Catocala unijuga* Wlk.; *Euclidia cuspidea* Hbn.; *Pelthis angulalis* Hbn.; *Hypena humeralis* Harr.; *Ichthyura inclusa* Hbn.; *Epicnaptera americana* Har.; *Hæmatopsis grataria* Fab.; *Bapta vestaliata* Gn.; *Apœcasia subœquaria* H. & S.; *Tetracis crocallata* Gn.; *Sabulodes transversata* Dru.; *Hyperetis amicaria* H. S.

HEMIPTERA FOUND IN THE RAINY RIVER DISTRICT

By J. F. BRIMLEY, Wellington, Ont.

LITTLE is known of the hemiptera of New Ontario. The writer hopes that the following list of species taken in the Rainy River District will be of interest. A considerable amount of this material has been submitted to Messrs. H. H. Knight and J. R. de la Torre-Bueno. For the help from these the writer wishes to extend thanks. The numbers refer to the earliest and latest month in which taken.

SCUTELLERIDAE

Homæmus aeneifrons Say; 8, 9.

CYDNIDAE

Thyreocoris ater A. & S.; 6.
" *anthracinus* Uhl.; 6.

Thyreocoris lateralis Fab.; 9.
" *pulicarius* Germ.; 10.

PENTATOMIDAE

Euschistus euschistoides Voll.; 6, 9.
" *tristigmus* Say.; 5, 10.
" *variolarius* P.B.; 9.
Neottiglossa undata Say.; 6, 7.
Cosmopepla bimaculata Thom.; 6.
Basana dimidiata Say.; 6.
Meadorus lateralis Say.; 6.
Elasmostethus cruciatus Say.; 6.
Perillus exaptus Say.; 5, 6.
Podisus maculiventris Say.; 5.
" *serieventris* Uhl.; 9.
" *modestus* Dall.; 6, 9.

COREIDAE

Protenor belfragei Hagl.; 9.
Megalotomus 5—spinosus Say.; 9.
Alydus eurinus Say.; 9.
" *conspersus* Montd.; 9.
Alydus eurinus Say.; 9.
" *conspersus* Montd.; 9.
Corizus crassicornis Linn.; 6, 9.

ARADIDAE

Aradus similis Say.; 6.
" *inornatus* Uhl.; 6.
" *tuberculifer* Kby.; 10.
" *lugrubris* Fall.; 7.
" *abbas* Bergr.; 6, 7.

NEIDIDAE

Neides muticus Say.; 6, 9.

LYGAEIDAE

Ortholomus scolopax Say.; 8.
Ischnorrhynchus resedae Panz.; 4, 5.
Cymus angustatus Stal.; 4, 7.
" *luridus* Stal.; 7.
" *discors* Horv.; 7.
Ligyrocoris diffusus Uhl.; 9.
Perigenes constrictus Say.; 8. 9.
" *costalis* Van D.; 9.
Sphragisticus nebulosus Fall.; 4, 9.
Scolopostethus thomsoni Reut.; 4, 10.

TINGIDAE

Corythucha ciliata Say.; 8.
" *marmorata* Uhl.; 8.
" *cydoniæ* Fitch,; 6.
" *pallipes* Parsh.; 6.
Physatocheila plexa Say.; 5, 7.
Leptoypha mutica Say.; 8.

REDUVIIDAE

Zelus socius Uhl.; 8, 9.
Acholla multispinosa DeG.; 9.
Sinea diadema Fab.; 9.

NABIDAE

Pagasa fusca Stein; 10.
Nabis subcoleoptratus Kby.; 9.
" *roseipennis* Reut.; 6.
" *rufusculus* Reut.; 9.
" *inscriptus* Kby.; 4, 6.

ANTHOCORIDAE

Xylocoris cursitans Fall.; 7, 9.
Anthacoris borealis Dall.; 7, 9.
" *musculus* Say.; 4, 7.
Triphleps insidiosus Say.; 9.
" *tristicolor* White; 9, 10.

MIRIDAE

Collaria meilleurii Prov.; 8.
Stenodema trispinosum Reut.; 7.
" *vicinum* Prov.; 5, 9.
Trigonotylus ruficornis Geoff.; 7.
" *confusus* Reut.
Platytylellus nigricollis Reut.; 7. 9.
Opistheuria clandestina ventralis Kngt.; 7.
Phytocoris lasiomeris Reut.; 7, 9.
" *salicis* Kngt.; 8.
" *eximius* Reut., 8, 9.
Stenotus binotatus Fab.; 7, 9.
Garganus fusiformis Say.; 7.
Horcias dislocatis goniphorus Say.; 7.
" " *pallipes* Van D.; 7.
Poecilocaposus lineatus Fab.; 7.
Polymeris proxima Kngt.; 6.
Lygidea rubecula obscura Reut.; 7.
Lygus communis Kngt.; 7, 8.
" *vitticollis*, Reut.; 7.
" *omnivagus* Kngt.; 7.
" *vanduzeei* Kngt.; 7, 9.
" *pratensis* L.; 4, 6.
" *oblineatus* Say.; 4, 6.
" *campestris* L.; 7.
" *rubricundus winnipegensis* Kngt.; 5, 8.
Neoborus amœnus Reut.; 7.
Xenoborus commesuralis Reut.; 8.
" *plagifer* Reut.; 7.
Comptobrochys grandis nitens Reut.; 4, 8.
Deraeocoris fasciolus Kngt.; 7, 9.
Hyaloides vitripennis Say.; 8.
Strongylocoria stygicus Say.; 7, 8.
Ceratocapsus modestus Uhl.; 8.
" *pumilus* Uhl.
" *digitatus* Kngt.; 8.
Lopidea lathyri Kngt.; 7.
Diaphnidia pellucida Uhl.; 9.
Orthatylus neglectus Kngt.; 7.
" *flavosparsus* Sah.; 6, 7.
" *dorsalis* Prov.; 8.
Microphylellus modestus Reut.; 7.
Psallus alnicenatus Kngt.; 8.

Plagiognathus alboradialis Kngt.; 7.
" *fraternus* Uhl.; 8.
" *obscurus* Uhl.; 7, 9.
" *politus* Uhl.; 8.
" *politus pallidicornis* Kngt.; 7.

HYDROMETRIDAE

Hydrometra martini Kirk.

GERRIDAE

Limnoporus rufoscutellatus Latr.

SALDIDAE

Salda coriacea Uhl.
Soldula major Prov.; 7.
" *interstitialis* Say.; 10.
Microcanthia humilis Say.

NOTONECTINAE

Arctocorixa alternata Say.; 10.

CERCOPIDAE

Philaenus leucophtalmus L.; 5, 6.
Clastoptera obtusa Say.; 8.
Clastoptera proteus Fitch.; 7.

MEMBRACIDEA

Cerasa diceros Say.; 7, 9.
" *bubalus* Fab.; 8.
" *taurina* Fitch.; 8.
" *basalis* Walk.; 8, 9.
Telemona pyramidata Uhl.; 8.
" *reclivata* Fitch.; 7, 9.
Cyrtolobus vau Say.; 7.
Entylia carinata Forst.; 6, 8.
Campylenchia latipes Say.; 7, 9.

CICADELLIDAE

Agallia sanguinolenta Prov.; 6, 7.
Idiocerus alternatus Fitch.; 7.
" *lachrymalis* Fitch.; 5, 7.
Oncometopia lateralis Fab.; 4, 8.
Graphocephala coccinea Forst.; 8, 9.
Dræculacephala mollipes Say.; 7.
Gypona striata Burm.; 8, 9.
Phlepsius irroratus Say.; 7, 9.
Cixius basalis VanD.; 7.

MIGRATION OF WESTERN PLANTS TO TORONTO REGION

By STUART L. THOMPSON

ANYONE who has spent a season on the prairie land of Western Canada must have noticed the "Tar-weed" (*Grindelia squarrosa*). This yellow-rayed member of Compositæ is as its name implies—sticky. The involucre of each head especially so, and is armed with an array of curved bracts. I soon learned to associate this plant with squirrel-tail grass in a very real sense, for I often found the ripened tails of the grass gummed and entangled in the sticky curved bracts of Grindelia. On returning east I missed the plant, until in 1920 I found one solitary specimen growing in the soil between the railway ties of a siding in the city. I have no doubt the seed had been transplanted east by some box car from the prairie. The plant did not become established here for I found no others in this locality.

It has always been my custom, when circumstances permit, to follow byways rather than highways in travelling. I, like many another observer, have learned that it is in unfrequented places that things are to be found. Last October while making a trip to the northern part of this county, I was motoring along a very deserted country road, so deserted that I doubt if I could find it again. Imagine my surprise to come upon a patch of my friend, the yellow Grindelia, within a few feet of the car wheels. There were about a score of them in various stages of bloom—a thriving little colony far from the home land surrounded by Easterners. For a moment it seemed like meeting an old friend in a strange land. Finding the plant on a railway siding, as related above, is easily explained, but by what strange chance did a few seeds happen to fall on the side of a deserted country road, a thousand miles from their natural range?

Another advent from the West we are now experiencing in the Toronto region is the Russian Thistle (*Salsola Kali* var. *tenuifolia*). I recall this plant on the sandy soil of Southern Alberta as a coarse low prickly affair tolerably common in waste areas. Of late there has been an "improvement" rage on in Toronto. Many of our best marshes have been replaced by sand and silt pumped onto them. This naturally kills the aquatic vegetation, and in a season or two we find the level sand completely overgrown with willow, wormwood, grasses and sedges. In some manner the Russian Thistle has found these level sandy stretches, and has become abundant—no doubt an interesting botanical incident, but an unwelcome noxious weed.

CONTRIBUTION TO THE KNOWLEDGE OF THE AVIFAUNA OF NORTH-EASTERN LABRADOR

By BERNHARD HANTZSCH

"Beitrag zur Kenntnis der Vogelwelt des nordöstlichsten-Labradors," von Bernhard Hantzsch, *Journal für Ornithologie*, Sechsundfünfzigster Jahrgang (56th annual publication), No. 2, April, 1908, and No. 3, July, 1908. Leipzig-I. Allgemeiner Teil (General Part), pages 175-202. II. Besonderer Teil (Detailed Part), pages 307-392.

(Translated from the original German text in the Emma Shearer Wood Library of Ornithology, Library of McGill University, Montreal, by M. B. A. Anderson, M.A., and R. M. Anderson, Ph.D., Ottawa, 1927.)

(*Continued from page 18.*)

Falco peregrinus anatum (Bp.) [p. 375] *Amerikanicsher Wanderfalke.*—DUCK HAWK.

Eskimo: *Kigavik, -vîk, -vît (partim)* after the voice.

Not very rare visitor and a sporadically breeding bird in our district. The Canadian *Neptune* Expedition secured two eggs of the species at Cape Chidley in 1903 (Eifrig, 1905, p. 240). [p. 375.] In the wooded parts in the south of Ungava Bay, which are rather rich in birds, this falcon according to Packard, is said to be abundant (Macoun, II, p. 253), and Bigelow calls it fairly common along the eastern Labrador coast (1902, p. 29), which probably is a little too much to say. According to Kumlien, it also breeds regularly in the Cumberland Sound district (1879, p. 82), from whence the Marischal College Museum in Aberdeen has a skin (A. L. Thomson, *in litt.*).

Like all the other birds of prey, this species in breeding as well as in migrating prefers to stay by the bird colonies, and since in our district these are only found in very small numbers, the species is not at all frequent here. In the spring and fall migrations the birds still appear near Killinek most regularly, and during the month of September, 1906, single specimens were repeatedly observed. I saw a duck hawk only once myself on the 19th of this month, moving along the rocky ridge in the bay of Killinek, but it soon disappeared again.

Falco columbarius Linnaeus [p. 376]. *Tauben-Falke.*—PIGEON HAWK.

Eskimo: *Kigaviarsuk, -sûk, suit (arsuk* = the small one, namely *Kigavik* = Gyrfalcon and Duck Hawk).

Not rare visitor of our district and breeding on the steep cliffs near the sea or in gorges in the interior. Farther to the south of Ungava Bay it becomes more frequent, but can sustain itself in our region, because living mostly on small birds. Spreadborough collected specimens near Cape Chidley in 1896 (Macoun, II, p. 255), and I saw the swift little falcon several times myself during the month of September on the Atlantic coast and in the Ungava Bay district. We were not fortunate enough to collect a specimen. The Eskimos in general do not hunt it, and it is said therefore to be often not very shy.

NOTE: It is probable, that occasionally birds of prey, other than those cited, visit our district; for example, *Accipiter velox* (Wilson) [Sharp-shinned Hawk], of which Spreadborough observed a specimen July 8, 1896, in North Labrador (Macoun, II, p. 224), or *Pandion haliaëtus carolinensis* (Gmelin) [Osprey], which breeds in the wooded part of Labrador and of which Dr. Grenfell observed a specimen at Nachvak in the spring of 1900 (Townsend and Allen, 1907, p. 371).

Asio accipitrinus accipitrinus (Pall).[64] [p. 376]. *Sumpf-Ohr-Eule.*—SHORT-EARED OWL.

Eskimo: *Imaingertak, -tâk, -tat* (etymology not clear; according to v. Schubert's informant, the Eskimos use this word ironically when anyone passes another silently without a greeting). (p. 377).

Occasional breeding bird in the interior of the country, in the coast districts more common at time of migration. Quoted also by Packard as a summer resident for the south side of Ungava Bay (Macoun, II, p. 265), by Bigelow for the region of Nachvak in northeastern Labrador (1902 p. 29). At Rama, a little south from the latter place, according to the statements made to me by the inhabitants there, this owl is also said to breed and I saw and secured several clutches of eggs from localities on the coast still farther south. Kumlien also knows the species as a probable breeding bird in southeastern Baffin Island, especially in the interior (1879, p. 81).

The birds like to feed on the frequently abundant mice of the species *Peromyscus maniculatus* (Wagner) [White-footed Mouse] and lemming (*Dicrostonyx hudsonius*) (Pallas) [Labrador Banded Lemming]. They are, however, content with all other possible little creatures and animal substances. In the winter they were not observed in our district. The Ravens, which eagerly pursue the concealed living bird, frequently betray their haunts.

A rather inferior skin in my collection (female ?) of the fall of 1904 from Hopedale, shows the following measurements: Wing: 318 mm. Tail: 158. Tarsi: 44. Bill: 29. Middle toe including the 18 mm. long claw: 40 mm.

[64] *Asio flammeus* (Pontoppidan) of A.O.U. Check-List, 1910.—R.M.A.

Asio magellanicus heterocnemis Oberholser[65]. *Labrador Uhu.*—LABRADOR HORNED OWL.

Eskimo: *Ikkêtojok, -jûk, -jut* (etymology not clear, whether connected with the call *ikkê* = cold! as Missionary Perrett states, is doubtful; *tojok* is participle of *tovok* = he has it large.)

The new subspecies proposed by Oberholser in 1904 and said to be correctly revised in nomenclature (Proc. U.S. Nat. Mus., XXVII, p. 187), occasionally in the case of a few individuals is said to visit the southwestern part of our more restricted district, from the wooded regions of southern Ungava Bay, where the species breeds not rarely (compare Macoun, II, p. 281). For a rather long time, indeed, the birds may not go into the treeless districts, especially since the old breeding pairs are more or less resident birds.

I have 2 specimens from the neighbourhood of Hopedale, apparently males, of the fall of 1905 and 20th October, 1906. Their measurements are as follows: Wing: 361; 362 mm. Tail: 255; 238. Bill: 40; 40.5 from the cere to tip: 27; 29. Tarsi: about 57; 60. Middle toe including the 30, 31 mm. long claws respectively: about 48, 45 mm. respectively.

Nyctea nyctea (Linnæus) [p. 377]. *Schnee-Eule.*—SNOWY OWL.

Eskimo: *Okpik, -pîk, -pit* (etymology not clear; according to Fabricius, derived from the West Greenland *opipok* = howling; according to von Schubert, on account of the hollow, hoarse voice. [p. 378].

The Snowy Owl is a regular visitor in our district, as long as it is covered with snow. During the summer months it disappears from the neighbourhood of Killinek, but is said to breed not at all rarely on the neighbouring mainland, especially farther in the interior. As my trained collector at Killinek wrote, she secured from there among others, a clutch of eggs in 1907.[66]

On the east coast of Labrador the Snowy Owl goes southward as least as far as Nain as a regular breeding bird, and I saw eggs from different localities. According to Packard, it also breeds in the south of Ungava Bay (Macoun, II, p. 282). Kumlien calls it frequent in southeastern Baffin Island (1879, p. 81), from whence the winter visitors of our district may in part come over.

2 skins of my collection, a male (?) of the winter 1901-1902 from Okak, and a female (?) of 1905-1906 from Hopedale, show the following measurements: Wing: 425; 435 mm. Tail: 270; 262. Bill: 41, from the cere to tip, 28.5; 29. Claw of the middle toe: 32; 35.

During my stay in Killinek I saw no Snowy Owls myself, although at the same time two or three specimens were observed by the natives. In summer, except at the breeding places, the birds are quite shy and not at all easy to shoot. On 16th October, while I was looking at some *Actodromas fuscicollis* [White-rumped Sandpiper] with the glass on the beach at Hebron, I suddenly heard directly behind me a strong rushing of wings and a deep, angry *Krohgogogok*, almost like a raven, but not quite so hoarse. Turning about I espied a Snowy Owl which had attacked me, flew quickly about me a few more times with remarkably rapid jerking motions of the wings and at the same time uttered its note. But when I pointed the gun at it, it disappeared quickly behind the hills. In spite of search I never got sight of another.

The missionaries told me that Snowy Owls with eggs and young had been repeatedly found in the neighbourhood.

At Killinek, as a rule, the first Snowy Owls appear with the autumn migrations of the ptarmigan, which along with the not rare lemmings (*Dicrostonyx hudsonius*) and mice (*Peromyscus maniculatus*) make up their favourite food. (p. 379). From that time on, one sees them occasionally during the whole winter, sometimes several at a time in one region. They also catch fish and other small marine animals, where water places remain open, but are otherwise satisfied with every possible animal matter, even bits of meat refuse near human dwellings. In general, they seem to get along quite well, since they are almost always fat. Therefore they are hunted by the Eskimos and eaten not unwillingly. Occasionally the Eskimos unintentionally catch single birds in fox traps. In hard winters the Snowy Owls are far less shy than at other times, indeed, are often bold and anxious to attack. They like to seek human habitations, and Herr Waldmann, the missionary, told me, for example, that a beautiful specimen had once sought the tip of the little church tower at Rama as a regular sleeping-place in the evening. During the winter these birds are far more active by day than at night. They only fly about when the Northern Lights or moonlight brighten the landscape. Along with the Ravens, the Snowy Owls are the only birds which regularly inhabit the waste mountain places during the whole winter.

[65] *Bubo virginianus heterocnemis* (Oberholser) of A.O.U. Check-List, 1910.—R.M.A.

[66] Since she, however, secured from the missionaries, who partly consider natural history objects as something un-Christian, and who also conduct trade operations, neither a box nor a cask for sending the skins and eggs collected, in spite of the fact that she told them for whom the articles were destined, and the missionaries had personally promised me their support, the objects, hardly to their benefit, must wait for another year, on account of which perhaps interesting material is lost for this work also.

Tyrannus tyrannus (Linnæus). [p. 379]. *Tyrann.*—KINGBIRD.

I mention this species, which at best occurs as far as southern Labrador as a breeding bird (Townsend and Allen, 1907, p. 378), although, to be sure, it was once collected in September, 1900, in southwestern Greenland (Helms, *Vid. Meddel. Nat. For. Kjöbhvn.*, 1904, p. 135), on account of a specimen in my collection, which Mr. Julius Lane killed close to his house in Killinek, in the middle of July, 1906.

The measurements of this specimen are as follows: Wing: 117 mm. Tail: 89. Bill: 18.5 from nostril: 13. Tarsi: 18.5. Middle toe including the 6 mm. long claw: 20 mm.

Missionary Perrett some years ago secured a bird like this on the Labrador coast at Maggovik, which is situated considerably nearer to the breeding districts. The number of wandering visitors of this kind, which have slight significance in the avifauna of a district, will naturally never be fully exhausted.

Otocoris alpestris alpestris (L.). [p. 379]. *Alpen-Lerche.*—HORNED LARK.

Eskimo: *Koppernoakpak, -pâk, -pait* (etymology not clear, perhaps connected with *koppako* = a cleft part, from the two feather ears.)

Not a rare breeding bird in our district. On the spring migration it is said to occur often in numbers and is looked upon by the Eskimos as a very welcome harbinger of spring. In the autumn, on the other hand, [p. 380], I observed only a few migrants, and Kumlien does not mention the species at all for Baffin Island, although it most probably occurs there.[67] Farther southward, it is well known on the whole Labrador coast and Ungava Bay.

Three specimens of my collection, two females breeding birds of 6th and 8th August, as well as a migrating male of 10th September, were so strongly in the moult that the measurements are incomplete and less than those given in Oberholser's detailed list, (*Proc. U.S. Nat. Mus.*, XXIV, 1902, pp. 881-2). Weight in the flesh: 39.2-46 gr. Total length: 165-174 mm. Spread of wing: 295-320. Wing: 95-105. Tail: 61-70. Tail+wing: 22-27. Bill: 12-13. Tarsi: 22.5-23.5. Middle toe including the 5-6.5 mm. long claw: 16-17.5 mm.

Iris: dark brown. Upper mandible: dark gray to black-brown; lower mandible, at least at the base, yellowish-white. Feet: dark gray to dull black; soles, whitish-yellow.

The three stomachs in two instances contained little stones; in one instance sand, a caterpillar skin, insect remains, seed-husks (Rörig), apparently of *Cerastium alpinum* L. Once I observed a bird which was hunting spiders, probably specimens of *Leimonia labradorensis* Thor.

The Horned Lark inhabits the stony hill-land of Killinek, particularly the sunlit southern slopes in the vicinity of a lake. Here it leads a quiet rather retired life, ducks motionless behind stones or in grass whenever one comes near, or runs away quickly. It is by no means shy, but for that very reason it is often overlooked in the uniform confusion of stones and is not at all easy to shoot from the right distance. If one watches quietly, a thing which in the breeding season can be done at a few meters distance, after some time it stretches the neck up and sometimes runs to an elevated stone or hillock, in order to look around for a moment. But if one moves, it conceals itself at once, and often is not to be found again at all.

I saw the bird fly only rarely, but particularly in the beginning of September, repeatedly heard their luring call, a rather soft, not at all striking *Dü, Düit.* I heard the pleasing, lark-like song of the male only once, on 6th August. The bird was sitting on a heap of stones. In the spring they are said to sing more frequently during the mating flight; at the time of my stay the song periods were already past.

Perisoreus canadensis nigricapillus Ridgway. [p. 380]. *Labrador-Höher.*—LABRADOR JAY.

Eskimo: *Koppernoaksoak* (*Kupanoaksoak*?), *-soâk, suit,* (etymology not clear; perhaps derived from *kupanoak* = bird in general, *-soak* = large.) [p. 381].

This species appears in the wooded districts of Labrador as a breeding bird, whose nest, however, is hard to find. It pushes up here to the most northern parts, and is said to come especially in the spring and autumn to the southern border of our district bounded by the scrub forest in Ungava Bay. At George River, in the southeast of the Bay it is said to be rather abundant, accord-

[67] Hantzsch, in his later Baffin Island ornithological journal ("Ornithologische Tagebuch. Aufzeichnungen während einer Reise in Baffinland," *Sitzungsberichte der Gesselschaft naturforschender Freunde zu Berlin,* 1914, p. 131) records obtaining two eggs from natives at Kikerten, Cumberland Sound, in 1909, noting this as the first breeding record from Baffin Island. He also saw one adult male at Isoa, Nettilling Lake, June 25, 1910. In 1923, Mr. J. D. Soper, on an expedition for National Museum of Canada, collected three specimens at Strathcona Sound, Admiralty Inlet, northern Baffin Island (about 73°N.), referable to *Otocoris alpestris hoyti* Bishop, the most northern record known for any *alpestris* form in North America. In 1924, Mr. Soper did not observe any horned larks in the Cumberland Sound region, but in summer of 1925 found them fairly common around Nettilling Lake, in south-central Baffin Island. Of 36 specimens collected the great majority, compared with the National Museum series, in consultation with Mr. P. A. Taverner, proved to be typical *O. a. hoyti,* while 5 specimens, if not typical breeding *O. a. alpestris,* were very much nearer to that race than to typical *hoyti,* and several intermediates were found between the two extremes. One specimen was practically indistinguishable from typical *Otocoris alpestris arcticola* Oberholser. In the summer of 1926 Mr. Soper also observed horned larks at Amadjuak and at Cape Dorset, on north side of Hudson Strait, referable to *hoyti.* The breeding range of *O. a. hoyti* appears therefore to cover most of the Northwest Territories, including parts of the southernmost Arctic islands and Baffin Island, while the breeding range of true *O. a. alpestris* is restricted to the Labrador peninsula, Newfoundland, and some areas above timberline on Gaspe peninsula, Quebec, intregrading with *O. a. hoyti* to some extent in the region of Hudson Strait.—R.M.A.

ing to the report of the Eskimos, who know the characteristic bird well.

Corvus corax principalis Ridgway. [p. 381]. *Nordischer Rabe.*—NORTHERN RAVEN.

Eskimo: *Tullugak, -kak, -kat,* (probably after the voice; Fabricius indeed wishes to derive the like-sounding Greenlandic designation from *tullorpok* = to join, because the ravens like to come together in bands.)

This large form of the Raven is not rare, in certain localities is even a rather frequent breeding bird of our district. He prefers the proximity of permanent human dwellings or such little places as serve the natives for habitations off and on; at other times also the neighbourhood of bird mountains and other breeding colonies. The old pairs at least, therefore, become in general resident birds in the narrowest sense of the word, seldom leaving their residence district even in winter. The young travel around widely.

Six skins of my collection, two males, four females, from the time of 4th September to 26th October, from the vicinity of Killinek and Rama, show the following measurements: Weight in flesh: 1725 g. (one male.) Total length: 675 mm. (one male). Spread of wings: 1330 (one male). Wing: 426-456. Tail: 247-282. Tail +wing: 45 (one male). Length of bill: 73-82. Width at base, 28-32. Tarsi: 63-72. Middle toe including the 16-20 mm. long claw: c. 61-64 mm. The larger measurements pertain in general to the males.

Iris: dark brown. Bill and feet: blackish.

One stomach contains berries (of *Arctostaphylos alpina* Spr.), as well as bones of a rather large fish (Rörig). Twleve Mallophaga which were collected prove to be: one male of *Docophorus ocellatus* Nitzsch, perhaps to be regarded as a variety; and four males, seven females of *Menophon gonophæum* Nitzsch (T. Müller).

The Raven seldom lay their four to six eggs before May, on rocky walls, difficult of access. Upon my arrival in the country the young had already flown away and were flying about in company with the old birds. The birds appear to be exceptionally wary and were difficult to kill. The easiest way was from houses and tents, which they occasionally flew over with their deep *Korrr*, and where the presence of human beings appears less noticeable to them. In winter, however, when hunger is afflicting them, they are said to become tamer. Then they are caught [p. 382] now and then in the fox-traps. They feed upon anything which is to some extent palatable. In the autumn they like berries and even mushrooms, in the summertime mostly animals caught alive, or carrion, of which the sharp-sighted birds always find enough on the beach. They also pick up mussels and other marine animals which remain behind at low tide.

The Eskimos do not hunt the Raven particularly. They respect the birds because of their cunning and wiliness, and weave around them all sorts of superstition.

(To be Concluded)

CHRISTMAS BIRD CENSUS, 1928

SUMMERLAND, OKANAGAN LAKE, BRITISH COLUMBIA, December 23rd, 1928.—From 8.30 a.m. to 4 o'clock p.m. Very strong southeast wind, almost a gale. Average temperature 28 degrees; cloudy, bare ground. Along ten miles of lakefront and adjoining fruit benches back to pine-clad hills. Observers separate. Horned Grebe 2, Pacific Loon 1, Herring Gull 2, California Gull 1, American Golden-eye 1, American Coot 580, Killdeer 12, Hungarian Partridge 4, California Quail 110, Pheasant 16, Golden Eagle 1, Sparrow Hawk 2, Screech Owl (gray phase) 1, Hairy Woodpecker 5, Batchelder's Woodpecker 1, Lewis Woodpecker 2, Red-shafted Flicker 19, Magpie 36, Black-headed Jay 6, Clark's Crow 1, Red-winged Blackbird 21, Western Meadowlark 3, Pine Grosbeak 36, Redpoll 30, Shufeldt's Junco 350, Song Sparrow 32, Bohemian Waxwing 700, Northern Shrike 3, Water Ouzel 5, Winter Wren 1, Brown Creeper 4, Slender-billed Nuthatch 4, Pigmy Nuthatch 15, Long-tailed Chickadee 50, Mountain Chickadee 24, Golden-crowned Kinglet 1. Total species 36; total individuals 2080. —HERBERT M. SIMPSON, ERIC M. TAIT, SYDNEY A. LIDDELL.

GLENEVIS, ALBERTA, December 23rd, 1928.—9.30 a.m. to 4.30 p.m. About 12 miles each on foot. Observers separated. Temperature at start 32° above zero, thawing at noon. Part cloudy. One inch of snow, hills bare. No wind. Through spruce timber and open country.

Ruffed Grouse 7, Sharp-tailed Grouse 30, Goshawk 1, Horned Owl 2, Hairy Woodpecker 8, Downy Woodpecker 4, Arctic Three-toed Woodpecker 1, American Three-toed Woodpecker 2, Pileated Woodpecker 1, Magpie 1, Blue Jay 7, Canada Jay 7, Pine Grosbeak 1, House Sparrow 7, Redpoll 18, Snow Bunting 61, Brown Creeper 4, Black-capped Chickadee 58, Hudsonian Chickadee 7, Golden-crowned Kinglet 2. Total 20 species, 229 individuals.—FRED. H. PEGG and GEORGE PEGG.

EASTEND, SASKATCHEWAN, December 26, 1928. —Valley of the Frenchman river and rough country to the south. 9 a.m. to 5 p.m. Fine, clear sky, cloudy later. No snow, except a little in the bush, wind west, light chinook. Temperature 18° at start, 32° at return. About 11 miles on foot. Sharp-tailed Grouse 4, Horned Lark 1, Magpie 13, Pine Grosbeak 9, Redpoll 2, Snow-bunting 2, Bohemian Waxwing 17, Chickadee 3. Total 8 species, 51 individuals. Also seen during December: Grey-crowned Rosy Finch 6, December 3; Northern Shrike 1, December 12; Horned Owl 2, December 24; Tree Sparrow 6, December 25. The Rosy Finches were seen at a farm three miles away; the Tree Sparrows are wintering in the town of Eastend.—L. B. POTTER.

WINNIPEG, MANITOBA, December 23.—Fair 15-mile southwest wind, temperature 30° to 37°. Ground lightly covered with snow in places. Four parties working in different directions. Green-winged Teal 1 (wintering on creek where open water prevails), Goshawk 1, Golden Eagle 1, Screech Owl 1, Snowy Owl 8, Ruffed Grouse 3, Pinnated Grouse 59, Hairy Woodpecker 2, Downy Woodpecker 4, Blue Jay 18, Canada Jay 2, Pine Grosbeak 39, Evening Grosbeak 4, Redpoll 10, Snow Bunting 61, Northern Shrike 1, White-breasted Nuthatch 19, Black-capped Chickadee 20, Robin 1 (positively identified). Total species 19, total individuals 255. (On the 30th, two flocks of over 500 Snow Buntings in each were noted within the area covered on the 23rd.) The list includes eight permanent residents, nine winter visitors, and two summer residents. Only three winter visitors were seen during the 1927 census, following an exceptionally cold period. Downy and Hairy Woodpeckers have remained stationary in numbers since 1925; Blue Jays and Chickadees have greatly decreased; White-breasted Nuthatches have increased in numbers annually.—H. C. PEARCE, DR. T. G. MCCARTHY, A. B. GRESHAM, A. A. MCCOUBREY, F. NEAVE, R. NEAVE, A. A. MCCOUBREY, JR., A. SHORTT, T. SHORTT, J. CARTWRIGHT, C. L. BROLEY and A. G. LAWRENCE (*Natural History Society of Manitoba*).

ATHENS, ONTARIO, December 27th, 1928.—1½ miles along Delta road (west of Athens), to a pine wood, then ¾ miles south to another wood and return. 1 p.m. to 5 p.m. Cloudy, ground mostly bare of snow, light south wind. Temperature 39° at start, 30° at return. About 5 miles on foot. Observers together most of the time. Ruffed Grouse 2, Blue Jays 4, Downy Woodpecker 1, White-breasted Nuthatch 4, Black-capped Chickadee 9. Total species 5, total individuals 20. —MURRAY W. CURTISS.

HAMILTON, ONTARIO (and vicinity), December 22nd, 1928.—Combined lists of five parties working independently in adjacent territory, three in the morning and two in the afternoon, between the hours of 9 a.m. and 5 p.m. Temperature 19° at 9 a.m., 26° at 2 p.m., and 22° at 4 p.m. Bright sunshine, light carpet of snow, and a light west wind. Territory includes marshland, woodland, open water, fields, hill-side and centre of city. Horned Grebe 2, Herring Gulls 323, Ring-billed Gull 1, Black Duck 28, American Golden-eye 30, Ducks (unidentified) 30, Ring-necked Pheasant 15, Screech Owl 1, Belted Kingfisher 1 (G.O.McM.), Hairy Woodpecker 4, Downy Woodpecker 15, Horned Lark 60, Blue Jay 3, Starling 1714 (2 flocks estimated at 1,000 and 700 each, small flock of 12, and 2 individuals), American Goldfinch 1 (alone, strange to say), Pine Siskin 1, Tree Sparrow 40, Slate-coloured Junco 250, Song Sparrow 9 (7 and 1 and 1), White-breasted Nuthatch 9, Black-capped Chickadee 98, American Robin 1. Evening Grosbeak 30. Total 21 identified species, 2633 individuals. Also over 700 English Sparrows. Belted Kingfisher identified inside the breakwater at Burlington.

On December 23, Dr. McMillan identified 10 Great Black-backed Gulls and 1 American Coot. Also one week earlier, on December 16, 1 Brown Creeper and 4 Golden-crowned Kinglets.—DR. G. O. MCMILLAN, H. C. NUNN, MR. and MRS. B. F. TURNER, GEORGE NORTH, MATHEW JOHNSTONE and J. ROLAND BROWN, *The Hamilton Bird Protection Society, Inc.*

FRASERVILLE, ONTARIO (near Peterboro), December 23, 1928.—7.35 a.m. to 5.05 p.m Cloudy in morning, clear in afternoon. Wind very light, easterly. Temperature about 28° to 32°. About 25 miles on foot. Black Duck 5, Great Blue Heron 2, Ruffed Grouse 1 (fresh tracks abundant), Goshawk 1 (also on 24th and 6th), Great Horned Owl 3 (heard at 6 a.m., 5 p.m. and 7 p.m.), Hairy Woodpecker 5, Downy Woodpecker 2, Starling 5, Blue Jay 2, Brown Creeper 1, White-breasted Nuthatch 8, Chickadee about 100, Tree Sparrow heard possibly. Total 12 species, about 175 individuals. Species since November 15: Snow Bunting, December 20; Goldfinch, December 16; Tree Sparrow, December 8; Golden-crowned Kinglet, December 2; immature Bald Eagle, November 29; Northern Shrike, November 26;

Screech Owl (heard), November 28; Lapland Longspur, November 17.—E. W. CALVERT.

BRODIE CLUB BIRD CENSUS AT TORONTO, 1928. —It has been found in the past that Christmas was not the most desirable day on which to have a bird census taken. However strong may be the call of the wild, the demands of family and home ties were even stronger. It was therefore decided by the Brodie Club to take the usual census on Sunday, December 23rd, being the nearest free day for all concerned to Christmas Day.

December 23, 1928, proved to be an ideal day for the purpose of Bird Census. There was no wind whatever and the temperature was very mild, 24° at 7.30 a.m. and 32° at 4 p.m. It was somewhat cloudy until 9 a.m., when the sky gradually cleared so that a light sun shone during almost the entire day, thereby dispersing the slight haze.

There had been some hard frosts so that the ground was solid and the marshes and shore-line of the lake frozen in sheltered spots. A light snow had fallen a few days previously and remains of it still lingered in sheltered ravines and unsunned places.

Five parties were observing, making in all 14 persons. The localities visited were the valleys of the Don both east and west with their branching ravines, Leaside, Ashbridge's Bay (or what is left of it), the valley of the Humber, Lake shore at Sunnyside and west to Humber mouth, High Park and Cedarvale. Distributed thus the various parties covered open lake water, frozen marshes, dense woods, open woods, valleys and fields and consequently were likely to see the birds of all habitats.

The result of the combined observations for all parties is as follows: Horned Grebe 1 ?, Herring Gull 240+, Ring-billed Gull 1, American Merganser 1, Black Duck 2, Scaup Duck 1, Golden-eye 28, Bufflehead 1, Old Squaw 170, Cooper's Hawk 1 (?), Red-shouldered Hawk 1, Sparrow Hawk 1, Barred Owl 1, Saw-whet Owl 2, Great Horned Owl 2, Hairy Woodpecker 5, Downy Woodpecker 12, Flicker 1, Blue Jay 3, Crow 1, Starling hundreds (1 flock of 500 by 1 party, a flock of like size reported by 2nd party), Meadow Lark a flock of 30, Pine Siskin 2, Snow Bunting, 1 flock of 50, House Sparrow seen by all parties, White-throated Sparrow 2, Tree Sparrow 35, Junco 29, Song Sparrow 17, Cardinal 1, Northern Shrike 1, Creeper 5, White-breasted Nuthatch 10, Red-breasted Nuthatch 1, Chickadee 144+, Golden-crowned Kinglet 1, American Robin 3, Florida Gallinule 4, Purple Finch 1, Ring-necked Pheasant 1, Redpoll 1.

In a general way there were many observations quite as could be expected. The usual winter birds were present and generally distributed. The open water of the lake accounts for the water fowl and gulls, though probably more would have been present had the water been entirely open instead of frozen within the "sea-wall". It is worthy of note that no Black-backed Gulls were seen, although a regular winter bird here. The Flicker is very unusual, in fact almost unknown, here in winter. Another such record was one seen on January 6, 1924, clinging to the vines about the lea side of a farm house amid a blizzard. There was an unaccountable dearth of Crows, only one being seen throughout the day. The unusual number of Meadow Larks is probably due to the absence of snow on open fields making feeding conditions possible for ground-haunting birds. It is significant to note in this connection that meadow larks have been seen since and two days after the census a Marsh Hawk was seen. The common Meadow-vole has been often seen and once the Deer Mouse found afield lately. The seeing of the two different White-throated Sparrows is interesting not only because this species is very rarely seen at Toronto in winter, but also that there were seen in same localities as last year (1927). This year the observers expected to record them as they were known to be in the vicinity. It would be well worth while knowing whether or not these two are the same individuals of the previous year.

The fact that Florida Gallinules were seen deserves special mention. The observer, Mr. L. L. Snyder, reports that he was examining a bit of sand-bar at Ashbridge's Bay, which though high and dry, was overgrown with weeds. The Gallinules were flushed from a small sheet of open water and at once took to the reeds, yet enough was seen to recognize the birds. Mr. Snyder returned a couple of times later and was successful in seeing the birds each time.

The Ring-necked Pheasant's presence can be accounted for as being one of several released in Humber Valley several seasons ago and are seen occasionally even yet.—STUART L. THOMPSON.

KINGSTON, ONTARIO, December 26, 1928.—9.30 a.m. to 3.30 p.m. No snow, wind southwest and light; temperature 30° at start, 36° at noon and 30° at finish. One hour in car and about five hours on foot. About 8 miles; observer alone.

Loon 1, Herring Gulls 32, American Mergansers 3, Lesser Scaup Ducks 5, Golden-eyes 30, Great

Horned Owl 1, Downy Woodpecker 1, Crows 60, Starlings 400 (estimated), Meadowlark 1, Song Sparrows 2, Cedar Waxwings 15, Brown Creeper 1, White-breasted Nuthatch 3, Chickadees 16. Total 15 species, about 570 individuals.—EDWIN BEAUPRE.

BRANTFORD, ONTARIO, Saturday, December 29th.—From 8 a.m. to 5 p.m. First group: 1 p.m. to 5 p.m. Seven miles. Second group: 8 a.m. to 4 p.m. Nine miles. Group No. 2 west of Brantford along the north side of Grand River to Paris. Group No. 1, southwest of Brantford on the Burford Road through three-cornered swamp over the hills to Mt. Pleasant and return to Brantford. Temperature 9. a.m. 25° above. 1 p.m. 30° above. 5 p.m. 24° above. Weather condition: high wind with snow flurries, but ground clear of snow.

Sparrow Hawk 1, Crows 100+, House Sparrow 100+, Goldfinch 6, Snow Bunting 10, Slate-coloured Junco 10, Brown Creeper 2, White-breasted Nuthatch 10, Chickadee 25, Golden-crowned Kinglet 8. Total 10 species, 272+ individuals.

One unidentified Hawk December 25th in the three-cornered swamp. We took 1 Robin, 10 Bronze Grackles and 6 Song Sparrows.—ANGUS BUCHANAN, HAROLD FULCHER, ROBERT HARRISON.

LONDON, ONTARIO, Saturday, December 22nd —This was the day chosen by the McIlwraith Ornithological Club for taking the bird census of the London district. As far as weather was concerned the choice could hardly be improved upon, for although it was rather cold and snappy, there was practically no wind and the sky was cloudless most of the day.

As usual a number of parties were sent out, seven all told, (a total of nine observers) and although the absence of winter birds from the north made a large list seem unlikely, when the individual trips were totalled at night it was found that we had exceeded all previous records.

The territory covered was principally the valley of the River Thames, and a number of interesting records were made which are duly noted in the detailed list which follows. The number of species recorded might even have been larger had we been able to locate the covey of Quail and family party of Short-eared Owls which were known to be in certain localities, but our luck deserted us there and we had to place them among the "also seen recently". As a matter of fact they were both seen the next day, December 23rd, but of course that was too late.

Combined list of seven parties some working in the morning and some in the afternoon practically from daylight until dark. Temperature 2° at 8 a.m., rising to 14° and then falling again to 8° at dark. Wind very slight, ground barely covered with snow, streams open, sky clear.

Herring Gull 6, American Merganser 27, Mallard 10 (first winter record and a very unusual number at any time), Black Duck 15 (very rare in winter), American Golden-eye 1, Ruffed Grouse 1, Pheasant 5, Mourning Dove 1 (sitting on a telephone wire), Sharp-shinned Hawk 1, Coopers' Hawk 2, Red-tailed Hawk 2, Rough-legged Hawk 2 (sitting in the same tree), Bald Eagle 2 (immature, together), Screech Owl 3, Great Horned Owl 2 (calling to each other across the river), Kingfisher 5 (quite generally distributed), Hairy Woodpecker 5, Downy Woodpecker 25, Blue Jay 38, Crow 28 (not as many as usual), Starling 139 (nearly all at a dump in the city), Purple Finch 2, Goldfinch 18 (generally distributed in small flocks), Snow Bunting 3, English Sparrow hundreds, Tree Sparrow 122, Junco 67, Song Sparrow 5, Cardinal 13, Winter Wren 2 (along the river bank but some miles apart, unusual in winter, and the first time we ever had two at this season of the year), Brown Creeper 4, White-breasted Nuthatch 27, Black-capped Chickadee 131, Golden-crowned Kinglet 54, Ruby-crowned Kinglet 1 (first winter record; examined at close range and positively identified by J. F. Calvert), Robin 1, Total 36 species, 770 individuals plus English Sparrows.

Also seen within a few days but missed on the census: Short-eared Owl, Long-eared Owl, Bob White, Horned Lark, probably either Alpestris or Hoyti, Marsh Hawk, White-throated Sparrow. Marsh Hawk.—ELI DAVIS, MR. and MRS. E. M. S. DALE, J. F. CALVERT, MRS. E. H. MCKONE, VERNON FRANKS, TOM WILLIS, W. E. SAUNDERS and C. G. WATSON, *McIlwraith Ornithological Club.*

OTTAWA, ONTARIO, December 23, 1928.—Annual Christmas Bird-Census of the Ottawa Field-Naturalists' Club. 5 parties, 8 observers.

First Party.—C. H. Sternberg, Raymond Sternberg. 9 a.m. to 3 p.m. South from Dow's Swamp along C.P.R. track, returning Metcalfe Road, 11 miles: American? Golden-eye 5, Crow 135, Starling 350, Red-winged Blackbird 2, House Sparrow 440, Pine Siskin 30, Tree Sparrow 5, Chickadee 12.

Second Party—H. B. Cannon, D. B. DeLury. 8.40 a.m. to 12.10 p.m. Experimental Farm, Rideau River and Canal, Hunt Club Road to Black Rapids and return, 15 miles, motor and on foot. American Merganser 1, American Golden-

eye 2, Downy Woodpecker 1, Crow 30, House Sparrow 20, Brown Creeper 3, White-breasted Nuthatch 3, Chickadee 26.

Third Party.—F. H. Ostrom. 8.30 a.m. to 5 p.m. Rideau Canal, Hog's Back, Prescott Highway. Merganser (sp. ?) 1, Owl (sp. ?) 1, Downy Woodpecker 3, Crow 10, House Sparrow 29, Snow Bunting 5, Northern Shrike 1, Chickadee 13.

Fourth Party.—B. A. Fauvel. 11 a.m. to 4 p.m. New Bridge over Ottawa to Ottawa South Garbage Dump, 10 miles. Gull (sp. ?) 1, Goldeneye (sp. ?) 12, Blue Jay 1, Starling 200, House Sparrow 25, Northern Shrike 1, Chickadee 25.

Fifth Party.—Robert Lockwood, Harlow Wright. 8.10 a.m. to 5.30 p.m. Breckenridge through Aylmer and DesChenes, 16 miles. Ruffed Grouse 2, Hairy Woodpecker 5, Downy Woodpecker 3, Blue Jay 1, Crow 1, Starling 4, House Sparrow 97, White-breasted Nuthatch 5, Chickadee 48.

Total—19 species, 1560 birds.

In the usual Ottawa Bird Census there have been 7 or 8 parties, but this year colds and influenza prevented a number of the regular observers from going.—D.B.DeL.

PAKENHAM, ONTARIO, December 27, 1928.—8.30 a.m. to 3.30 p.m. Clear and mild; two inches of snow; ground bare in places; east wind, light; temperature 28° at start, 38° at return. Eighteen miles on foot. Observers separate.

Ruffed Grouse 11, Snowy Owl 1, Hairy Woodpecker 2, Blue Jay 6, English Starling 14, White-breasted Nuthatch 7, Black-capped Chickadee 23. Total: 7 species; 64 individuals.

The Snowy Owl was discovered about 3 p.m. perched in a spruce tree near a clearing in the woods. Nine Grouse were crouched under the tree.

Birds are very scarce here. No Grosbeaks have been noted. Redpolls and Snow-buntings have been seen only occasionally since November. On December 31, we saw a flock of approximately a thousand Snow-buntings.—VERNA M. ROSS, EDNA G. ROSS, ALLAN F. ROSS.

EAST BAY, MANITOBA, December 27.—Four-hour walk through woods and prairie. Bright, strong northwest wind. Two inches of snow in woods, bare in open spaces. Temperature up to 35°. Sharp-tailed Grouse 12, Canada Jay 1, Pine Grosbeak 1, Snowflake, approximately 110 in flock, Chickadee 4. Total: 5 species, 1181 total birds. (A Short-eared Owl has been seen twice recently).—EDWARD ROBINSON.

NOTES AND OBSERVATIONS

BIRD MIGRATION AT VINELAND STATION.—Lately I have been looking through some copies of *The Canadian Field-Naturalist* lent me by a friend, and I thought perhaps you might find something of interest in the observations I have made lately in this district.

Situated here on the Experimental Farm right on Lake Ontario, three miles from the Hamilton Highway, we see many birds in migration, because they seem to go round the lake rather than across. This therefore places us well in a path of migration and during that period we have much bird life to interest us, but the last two months have been the most interesting winter months in respect to bird life that I have experienced since starting bird records in 1923.

In December the main item of interest was the arrival of a female Cardinal, December 6th, which remained until December 18th. This was the first I had seen. Two days after it arrived a Robin put in an appearance. It remained until December 22nd. Whether these birds migrated or were devoured by cats is not known, but since those dates neither has been seen, whereas during the time they were here we saw them daily. The robin particularly, because it came regularly to feed under a spruce tree near one of the cottages and frequently sang as if spring was here.

Chickadees which I have failed to see here for some years have been most common. They became common during August in the orchards (aphids during that part of August were very bad) and have remained with us in numbers ever since.

Ordinarily the White-breasted Nuthatch in January and February have only been found in very sheltered spots, but this winter they have been very common, whereas the Junco, which is usually common all winter and until late spring, particularly in a spruce hedge nearby, was not seen from December 22nd until February 1st, and then only one. On February 4th, however, I saw several with Tree Sparrows.

The Tree Sparrow has been very common and on January 21st a Fox Sparrow was along with them, busily scratching on the ground under a spruce. April 14th has been the earliest date I have observed this latter bird in migration.

The Starling is here in increasing numbers,

but is only seen occasionally during the winter. For two days (January 30 and 31), following a heavy snowfall, five of them kept coming about the buildings, evidently in search of food. They nest here regularly and in two cases that I know of they have driven out Flickers to do so.

On January 21st, a blustery day, I observed a pair of birds which were new to me. They may have been the Northern Shrike. The Loggerhead is a regular visitor here, often being seen, both in winter and summer. From the rear the two strange birds might have passed for Robins. The same slaty gray and wing mark as the Robin, but they were gray all over. They were not so slender as the Loggerhead and showed no white when flying.

Snowflakes in a tremendous flock were common for two or three days following January 24th. These I had an excellent opportunity of observing. While endeavoring to get a good look at them through glasses, they flew off but returned, alighting, with me about the centre of the flock. They seemed to be alone. I watched carefully because the only time I had observed a Lapland Longspur was with a flock of them in 1926.

January 31st and February 4th, both beautiful days with lots of snow on the ground, were both full of bird life.

My home is built in an old apple orchard and the house is surrounded by ten aged trees, with others near by. On January 31st, just near it, were Chickadees, Tree Sparrows, a Fox Sparrow, five Starlings, a Downy Woodpecker, and a White-breasted Nuthatch. On February 4th, at noon, there were three Downy Woodpeckers, several Chickadees, about twenty-five Tree Sparrows, accompanied by three or four Juncos and two or three Nuthatches (these latter feed on suet in a tree by the house).

One morning when leaving for work, the snow about the apple trees was clean and white. By noon it was all strewn by bits of rough bark pulled off by Chickadees, Downys and Nuthatches in search of grubs.

Pheasants, Crows and Prairie Horned Larks remain with us all year, but I have not noted any this winter. The spring flights of these latter always afford us much interest. Kinglets (Golden Crowns) have been here during the winter as well.

We are now looking for the time when birds will be migrating again, so we can get out with them. —GEO. H. DICKSON.

A NOVEL BIRD-BANDING NOTE.—After a continual study of the operation of bird-banding traps, many of us will often form our own ideas regarding the habits of birds when they suddenly find that the latticed framework which they have so long regarded as a source of unfailing food has fallen with a terrifying thud, confining the poor victims within.

If we watch very closely, we will see that the very second the drop-trap commences to fall, the bird, true to its ever alert attitude, flies directly in whatever direction it may happen to be facing. From the time of its capture till its removal the bird is continually fluttering hopelessly about exhausting itself by dashing its head at random through the larger openings in the network. (This refers mostly to the majority of birds smaller than the Bronzed Grackle.)

It was this last purposeless fluttering that gave me an idea concerning the removal of such birds from the trap. I had previously noted that many birds had invariably escaped where any portion of the trap allowed a sufficient opening for them to squeeze themselves to freedom, and I had especially noted that the bird was exceedingly quick to find such an opening. So, being without a gathering cage at the time and with a desire to procure a worthy substitute for one, I picked up the first thing that my eyes came in contact with, namely, an average sized glass jar with a fairly wide mouth. I placed the jar at the door end of the trap, and the bird, eager for an avenue of escape, dashed into the jar. Why? Because the door was open at the end, I was on the other side and the jar was so clear that the bird was completely deceived by its transparency. You will say that the bird would receive injury from dashing point blank into a hard glass jar. It didn't. The bird, always acting on the spur of the moment, had not sufficient run nor space to use its wings to advantage in to allow it to injure itself in any way. Then I just put my hand over the mouth of the jar and carefully extracted the bird.

One of the main advantages is having the jar as short as possible, just about the length of the bird to be removed. It would be well to have a separate size for each species. However, this scheme will in most cases only be found feasible in gathering the smaller birds.

Now, of course, one might go so far as to make this bottling a real science, if he thought that its results merited his time and patience. But to the writer it hardly sounds worth while, and after all it is only an experiment, depending solely on the natural reaction of a bird when it finds itself in such a precarious position.—W. PHILIP GERALD.

A CHICKADEE-GROUSE ALLIANCE.—On Sunday ,

March 25th, 1928, while trudging through wet crusted snow in a thorn-bush coppice, adjoining deep woods where a number of Crows (*Corvus a. americanus*) were racketing, I was suddenly accosted some little distance away by a rapid succession of a Chickadee's *dee-dee* note, much more persistent than the usual alarm. On approaching the source, the notes as suddenly ceased and no bird was visible, although I called him several times. I eventually located the Chickadee (*Penthestes a. atricapillus*) perched on a last year's Goldfinch nest, where he remained for two or three minutes in a "frozen" attitude without further utterance.

When I at length moved up within a few feet he again sounded his tattoo which strangely suggested a danger signal. To my surprise, some strikingly similar sounds followed from the ground not more than twenty feet distant and a splendid cock Ruffed Grouse (*Bonasa umbellus togata*) stepped out from under a thorn tree where, on a patch of bared ground, there proved to be a pile of soggy and somewhat fermented thorn apples, (I afterwards pondered whether the lengthy, rigid pose of the Black Cap was due to his possible indulgence in these thorn apples—as Chickadees vary their regular insect diet with wild fruit on occasions—or to his desire to escape detection during his apparent, assumed guardianship of the Grouse's hiding-place.)

His Grouseship displayed beautifully, whether or not "under the influence", as he strutted over the snow with proud head and crest erect, his neck bedecked with raised Elizabethan ruff, and full-spread tail resembling an artistically patterned fan—an aristocrat to the tips of his toes. As we played hide-and-seek in and out of the thorn bushes, the grouse *quit-quitted* intermittently, and opened and closed his tail, according to the degree of pressing on my part. The tail was twitched downwards off and on, spasmodically, with a corresponding jerk of the head, but otherwise was kept level with the surface of the snow.

On my pressing closely, the old cock made wonderful running time over the snow, the Chickadee appearing off and on with customary inquisitiveness, these two birds being apparently the only occupants of this patch of woods at the time. After heading the grouse off by a detour, he veered round and, through my glasses, I watched the Black Cap escort him with reassuring *chick-a-dee-dees* until he finally ended up at his pile of thorn apples.

Examination of the grouse's tracks seemed to show that the comb-like winter growth on the toes—his "snow-shoes"— was already shedding, while the marks of the occasional tail-dips were also in evidence on the snow.

As I arrived at the scene anew, the Chickadee again *dee-dee'd* emphatically but when the grouse suddenly sprang into flight the Black Cap instantly, and for the first time, piped his care-free "sweet sugar" notes, three times repeated, as if realizing his responsibility was over.

Fancied or real, this playing of the role of "lookout" on the part of the Chickadee and the association, if only of a temporary nature, between two birds of such remote relationship was, to the mind of the observer at least, a most interesting occurrence.—NAPIER SMITH.

OCCURRENCE OF THE GREAT GREY OWL IN THE MONTREAL DISTRICT.—The Great Grey Owl (*Scotiaptex n. nebulosa*) is a sufficiently rare winter visitor in these parts to warrant recording its appearance, especially in the possible event of other occurrences being recorded which might tend to throw light on the cause of its appearance, *e.g.* adverse food conditions in the far north.

The present record refers to an individual evidently sojourning on Nuns' Island which at its nearest point is about one-third of a mile off the south shore of the Island of Montreal, just opposite the City of Verdun.

While walking along the winter road over the ice and approaching Nuns' Island, at about 4.45 p.m. on Sunday the 12th February, 1928, and while observing a few Snow Buntings (*Passerina n. nivalis*), my attention was attracted to a huge dark owl which, in true owl fashion, swooped upwards to the top branches of a small tree clump, some twelve feet above the snow. This clump stood bare-limbed and alone at the apex of a low-lying point of land which was merged with the river scheme under the winter blanket of snow, the branches appearing to be caught upright in the river ice some fifty feet from shore.

The wind came in gusts out of the north, driving little clouds of snow along the surface of the river, but despite the icy blasts and the bleak position of its lookout, the Great Grey, apparently an adult female, sat at perfect ease in her luxuriant coat of feathers and allowed me to approach within some forty yards before taking wing. At least one Snowy Owl (*Nyctea nyctea*) is usually to be found at this season on the island, where one or two haystacks serve as winter headquarters for the mice population, but a real live Great Grey Owl was indeed an interesting innovation.

Between the gusts of wind, the owl visibility was excellent in the nearly horizontal rays of the sinking sun although, when I first viewed her

she blended softly with the neutral grey background of the bare hardwood trees on the island. As I came alongside the island, however, she stood out boldly against the opalescent wintry sky, the abnormally large round head giving the bird a top-heavy appearance. The large size of the bird is, of course, more apparent than real, due to the profusion and looseness of the feathers.

At a distance, the bird appeared to be of a solid grey color, but at fifty yards or so, in the sun light the mottling of the feathers was discernible, although I was unable to detect the small lemon yellow eyes without field glasses. If she appeared huge in the stunted tree growth, she looked a veritable "eagle-owl" as she flew toward the Verdun shore, alighting some 150 yards away on a rise in the ice, near which some tins and refuse had been thrown out, the long wings and tail and dark coloration emphasizing her bulk as she skimmed over the surface of the snow.

Her new lookout was just opposite the city dump and incinerator on the Verdun shore where, presumably, the Great Grey would betake herself after sundown, when the coast was clear and under cover of darkness. This dump is patronized by the city band of Starlings (*Sturnus vulgaris*) during the daytime and, incidentally, it may be mentioned that I saw on this date one individual of the latter species arriving at its home in the cornices of the big Roman Catholic church in Verdun, with considerable nesting material in its beak.

As the day was drawing to a close, I left the Great Grey sitting stoically on the ice mound in the full sweep of the cold north wind, a spooky owl form dimly outlined against the evening wind.—NAPIER SMITH.

MOCKINGBIRD WINTERS AT HAMILTON, ONTARIO.—In the morning of November 14th, 1927, a flock of four or five Chickadees became greatly agitated over the presence of a strange bird at a suet bag in an apple tree in my garden. The strange newcomer proved to be less interested in the suet than in the recently frozen grapes which had been left on adjacent vines to attract Robins and Flickers as in a former winter. To these it came almost daily until they were frozen too hard to be crushed by its long, dark bill. In the meantime the writer identified it as a Mockingbird. Among those who have verified that identification is Mr. Thomas Allan who formerly kept Mockingbirds in the cage.

Early in December California grapes were placed on the ground where the bird was accustomed to feed, but, at first, they were taken very reluctantly. They were too large to be taken whole and too tough to be torn readily. When cut into small pieces they proved to be delectable and, supplemented by pieces of raw apple, boiled potato, yolk of hard-boiled egg and traces of raw meat chopped fine, have constituted his chief diet up to the present (January). Since the establishment of the lunch counter the bird has come into the garden early each morning and has remained with us nearly all the time until evening. On colder days it feeds at intervals of about twenty or thirty minutes and retires to the grape arbour or to a more sunny, sheltered position close to the house. At first it was quite trustful and would remain in the arbour while people moved about freely in the garden, but of late, through unknown cause, it has been decidedly timid, concealing itself or flying from the garden on the approach of anyone. Up to the present the writer has been unable to determine where it spends the night.—GEO. MCMILLAN.

SOME MEASUREMENTS OF THE COMMON CROW (*Corvus brachyrhyncus brachyrhyncus*).—Through the kindness of Mr. Jack Miner, the Royal Ontario Museum of Zoology has recently received a number of crows in the flesh which were captured in his deservedly famous crow-trap. These specimens are of particular interest for comparative studies, being about equally divided as to sex and all having been taken on the same day (February 24, 1928) and at the same place (Kingsville, Ontario). Prior to the specimens being made into skins the writer made rather careful measurements in millimetres of the principal dimensions of each bird. Examination of the skulls and plumages indicates that all specimens may be considered as adults. Below, the measurements are tabulated, the complete measurements of the largest and smallest individual of both sexes being given as well as the averages for each sex.

MALES

	Length	Tail	Wing	Culmen	Tarsus	Mid. Toe Claw
Largest Male....	528	189	319	50	60	49
Smallest Male...	474	172	320	43	58	45
Average for 12 Males.....	489.83	181.17	313.58	46.83	60.16	47.16

FEMALES

Largest Female..	482	180	315	44	58	47
Smallest Female.	441	165	283	38	53	45
Average for 13 Females.....	465.3	170.61	299.03	42.46	56.67	45

It will be noted that there is a correlation between size and sex, males being larger than females on the average, although the sexes intergrade in size. The difference is less striking, however, when the measurements are converted into inches; for example, the difference in the average length of the two sexes is 24.53 millimeters which is slightly less than one inch.

In working out the percentages of the various dimensions from the average measurements, using the length as the divisor, the corresponding figures were the same for both sexes when carried only to the second decimal place.—L. L. SNYDER, *Royal Ontario Museum of Zoology, Toronto.*

THE SMOKY SHREW AT LONDON, ONTARIO.—The past season appears to have been a pretty good one for Sorex fumeus. There are two areas near London where it occurs and one of these was trapped this fall, one specimen being taken on October 27 and two each on October 29 and November 1. These were on a springy hill where the tree growth is hemlock, cedar, tamarack, pine, beech and maple; and the other locality where it was first taken in this district, and which is a black spruce sphagnum swamp, was not visited. It seems curious that so few of these animals are taken in the Province. My experience at London would lead me to conclude that they are not uncommon animals but when I get away from London I am never able to find any at all, so it may be that Middlesex is a specially good county for them. The two locations are nine miles apart and some of the intervening territory has been trapped without success.—W. E. SAUNDERS.

BREWER MOLE IN ONTARIO.—On December 16 I visited a farm half a mile west of Mount Brydges and fifteen miles west of London where these animals have been found in the past. Apparently 1928 has been a good breeding season because their runs and hills were very numerous in several fields. In one place the hills were not connected by surface runs and earth in the hills was nearly black, leading one to surmise that in this particular part of the field the mole might have been the star-nose mole, instead of Brewer mole, but the latter is the common one of the district. Mr. West, on whose farm they occurred told me that the cat brought in two of these during the summer, one of which was a particularly fine, large specimen. This animal has been noted in an area about five miles across and doubtless occurs in many other parts of the township, (Caradoc), the soil of which is largely sandy and is noted for its potatoes.—W. E. SAUNDERS.

MALLARDS TARDY IN MIGRATING.—Colin C. Campbell, Reston, Man., reports that hundreds of Mallards remained feeding on hailed-out grain around the Reston district until December 28. They have not been seen since that date. The birds were coming from Oak Lake and Plum Lake, which, owing to the mild weather were still open until towards the end of the month. Mr. Campbell estimates that there were in all between one and two thousand Mallards making the lakes their headquarters and spreading around the district to feed on the spoilt grain. The area occupied by the ducks was free of snow.—A. G. LAWRENCE.

OCCURRENCE OF THE EUROPEAN STARLING (*Sturnus vulgaris*) AT PETIT ROCHER, N.B.—According to an item which appeared in the *Bathurst Northern Light*, of Bathurst, New Brunswick, and which was reproduced in the *Campbellton Graphic* of May 24, 1928, a specimen of the European Starling was found dead on May 6, 1928, in Petit Rocher, New Brunswick, by Sydney DesBrisay, and identified by Mr. James McIntosh, of Bathurst.—HARRISON F. LEWIS.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS

Published by authority of the National Parks of Canada Branch, Department of the Interior Canada

In the following returns upon banded birds it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Birds Act of Canada and the United States. The great majority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil, or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

RETURNS UPON BIRDS BANDED IN 1920

BLACK DUCK, No. A.B.B.A. 37,318, probably banded by H. S. Osler, at Lake Scugog, Ontario, during the fall of 1920, was killed at a place on the north side of Pocomoke Sound, Maryland—reported on November 22, 1927. This band was issued to H. S. Osler, who cannot account for its use.

RETURNS UPON BIRDS BANDED IN 1922

MALLARD, No. 1,403, ad., m., banded by Gussie Innes, at Kinalmeaky Farm, Headingly, Manitoba, on November 11, 1922, was shot at Wylie, Pennington County, Minnesota, about 60

miles south of international boundary, during the year 1923.

MALLARD, No. 230,335, banded by F. C. Lincoln, at the Sanganois Club, Browning, Illinois, on November 20, 1922, was found dead in a gopher trap on Section 34, Township 2, Range 13, west of second meridian, about one mile south of Bromhead, Saskatchewan, on May 4, 1928.

BLACK DUCK, No. 207,776, banded by H. S. Osler, at Lake Scugog, Ontario, on September 22, 1922, was found wounded in a muskrat trap, by a resident of Cape Elizabeth, Maine—reported on April 9, 1928. The bird was killed.

RETURNS UPON BIRDS BANDED IN 1923

CROW, No. 210,674, juv., banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on June 14, 1923. was shot at Sioux Bridge, Qu'Appelle Valley, Saskatchesan, about 1½ miles from the place where it was banded, on May 24, 1928.

RETURNS UPON BIRDS BANDED IN 1924

BLACK DUCK, No. 237,257, banded by L. V. Walton, at Cuivre Island, Firma, Missouri, on April 6, 1924, was caught in a muskrat trap on Dead River, about 16 miles east of Biscotasing, Ontario, on May 4, 1926.

BLACK DUCK, No. 323,403, banded by H. S. Osler, at Lake Scugog, Ontario, on October 8, 1924, was killed on the Ohio River, 45 miles southwest of Louisville, Kentucky, on December 22, 1927.

BLACK DUCK, No. 323,435, banded by H. S. Osler, at Lake Scugog, Ontario, on October 10, 1924, was killed on the Kentucky side of the Mississippi River, three miles above Hickman, Kentucky, on January 27, 1928.

PINTAIL, No. 202,944, m., banded by J. G. Cunningham and J. A. Munro, at Lulu Island, British Columbia, on April 3, 1924, was killed at Ladner, British Columbia, on January 30, 1928.

RETURNS UPON BIRDS BANDED IN 1925

GLAUCOUS-WINGED GULL, No. 232,811, nestling, banded by Theed Pearse, Mitlenatch, Gul fof Georgia, (North), British Columbia, on July 25, 1925, was found dead on the beach on February 22, 1928—reported by a resident of Refuge Cove, British Columbia.

GREAT BLACK-BACKED GULL, No. 334,-022, juv., banded by Harrison F. Lewis, on Haystack Island, Wolf Bay, Saguenay County, Quebec, on July 26, 1925, was shot at Codroy, Newfoundland—reported on May 15, 1928.

HERRING GULL, No. 309,579, juv., banded by Harrison F. Lewis, on Eastern Island, St. Mary Islands, Saguenay County, Quebec, on July 17, 1925, was shot at Codroy, Newfoundland, on April 27, 1928.

CASPIAN TERN, No. 378,254, m., banded by F. C. Lincoln, at St. James, Michigan, on July 19, 1925, was collected for scientific purposes at Wasaga Beach, Simcoe County, Ontario, on June 3, 1928.

MALLARD X WHITE ENGLISH CALL DUCK, No. 309,761, dark, banded by Reuben Lloyd, at Davidson, Saskatchewan, on August 9, 1925, did not migrate in the fall on account of mild weather, was wintered and turned loose in the spring of 1926, as a one-year-old male, and was found in a barn at Govan, Saskatchewan, on November 14, 1927. The bird was not wounded, and was very tame. It was kept in captivity until the spring of 1928, when it was trampled upon by horses in a barn and died.*

BLUE-WINGED TEAL, No. 323,711, banded by H. S. Osler, at Lake Scugog, Ontario, on September 18, 1925, killed on St. John's Lake, being land drained by irrigation ditches, during the month of December, 1926—reported by a resident of Blodgett, Missouri.

PINTAIL, No. 105,706, m., banded by F. W. Robl, at Ellinwood, Kansas, on February 26, 1925, was shot by a resident of Grande Prairie, Alberta, about the middle of May, 1927.

MARSH HAWK, No. 320,535, ad., f., banded by G. C. Rinker, at Hamilton, Kansas, on December 3, 1925, was killed at Tompkins, Saskatchewan—reported on March 18, 1928. When the bird was banded it had an injured leg which was treated with an antiseptic. When the bird was killed it had only one leg.

CHICKADEE, No. 50,712, banded by C. A. Patriquin, at Wolfville, Nova Scotia, on January 10, 1925, was probably picked up dead in the spring of 1925—reported by C. A. Patriquin. The band was removed and placed an another Chickadee on March 27, 1927.

ROBIN, No. 264,318, ad., m., banded by Ralph E. DeLury, at Ottawa, Ontario, on June 24, 1925, was re-caught at the same station on April 28, 1926, was seen daily at the same station feeding under or near traps until May 8, 1926, and was found dead at a place about 200 yards from the trap in which it was banded on May 11, 1926.

RETURNS UPON BIRDS BANDED IN 1926

RED-THROATED LOON, No. 301,426, juv., banded by Harrison F. Lewis, on the eastern St. Mary Island, Saguenay County, Quebec, on August 4, 1926, was shot at Harrington Harbour, Saguenay County, Quebec, during the month of May, 1928.

GREAT BLACK-BACKED GULL, No. 333,-045, im., banded by R. W. Tufts, at Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. Apparently the bird had been dead for a long time.

GREAT BLACK-BACKED GULL, No. 418,-417, juv., banded by Basil Colbran, at Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 418,-419, juv., banded by Basil Colbran, at Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

*C.F.-N., XLII, 1928, p. 110.

GREAT BLACK-BACKED GULL, No. 421,-331, juv., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-332, juv., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-336, juv., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-717, im., banded by R. W. Tufts, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-718, im., banded by R. W. Tufts, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-731, im., banded by R. W. Tufts, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-759, im., banded by R. W. Tufts, on Gull Island, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421-, 764, im., banded by R. W. Tufts, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-773, im., banded by R. W. Tufts, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421-, 804, im., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-807, im., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-808, im., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-822, im., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which its was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 421,-838, im., banded by Basil Colbran, on Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the Island on which it was banded, during the month of October, 1926. The bird had apparently died a long time before its body was found.

GREAT BLACK-BACKED GULL, No. 418,-874, juv., banded by Harrison F. Lewis, on Murre Island, Wolf Bay, Saguenay County, Quebec, on August 13, 1926, was killed at Grole, Hermitage Bay, Newfoundland, on October 31, 1927.

HERRING GULL, No. 336,338, banded by Harold C. Wilson, at Sister Islands, Wisconsin, on July 9, 1926, was found dead on Sunnyside Beach, Toronto, Ontario, on June 26, 1928.

HERRING GULL, No. 377,58-, banded by William I. Lyon, at Gravel Island, Door County, Wisconsin, on July 12, 1926, was found dead at Point Pelee, Lake Erie, Ontario, on May 5, 1928. The bird had apparently died a short time before it was found. The last figure of the band was entirely obliterated.

DOUBLE-CRESTED CORMORANT, No. 464,059, juv., banded by Harrison F. Lewis, on Fog Island Sanctuary, Saguenay County, Quebec, on August 16, 1926, was killed at Island Harbour, Fogo District, Newfoundland, on May 14, 1928.

MERGANSER, species (?), No. 457,458, banded by William I. Lyon, at Little St. Martin's Island Shoal, Michigan, on July 17, 1926, was caught in a net at a place five miles east of Long Point Island, Lake Erie, Ontario, on December 6, 1927.

MALLARD, No. 409,321, banded by F. C. Lincoln, at Bath, Illinois, on January 8, 1926, was recovered on Caribou Island, Slave River, Alberta, shortly before June 19, 1928.

MALLARD, No. 409,747, banded by F. C. Lincoln, at Bath, Illinois, on January 11, 1926, was trapped in the Waterhen Indian Reserve, Manitoba, about May 1, 1928.

MALLARD, No. 305,257, banded by John Broeker, at Portage des Sioux, Missouri, on

March 9, 1926, was shot during the fall of 1927 —reported by a resident of Biggar, Saskatchewan.

MALLARD, No. 456,351, banded by F. H. Rose, at Moiese, Montana, on October 30, 1926, was shot at a place twelve miles south of Seven Persons, Alberta, on September 16, 1927.

MALLARD, No. 456,364, m., banded by F. H. Rose, at Moiese, Montana, on October 31, 1926, was shot at a place about seven miles southwest of Forestberg, Alberta—reported on October 15, 1927.

MALLARD, No. 420,501, juv., f., banded by Bert Lloyd, at Davidson, Saskatchewan, on November 5, 1926, was killed on White River, Barry County, Missouri, about November 25, 1926.

MALLARD, No. 421,958, banded by Bendick Brothers, at Grathside Farm, Leduc, Alberta, on November 9, 1926, was killed at Lewiston, Idaho, on December 15, 1926.

MALLARD, No. 421,973, m., banded by Bendick Brothers, at Grathside Farm, Leduc, Alberta, on November 9, 1926, was shot at Wetaskiwin, Alberta, on November 13, 1926.

MALLARD, No. 456,476, banded by F. H. Rose, at Moiese, Montana, on November 27, 1926, was shot in the Crossfield district, thirty miles north of Calgary, Alberta, on November 5, 1927.

MALLARD, "Write Saint John, Box 8-5," f., hatched in the spring of 1926, was banded by R. H. Bruce, on the Bird Sanctuary at Rockwood Park, Saint John, New Brunswick, during the month of November, 1926, and was shot at the head of St. Mary's Bay, Nova Scotia, on November 11, 1927.

BLACK DUCK, No. 457,597, banded by H. S. Osler, at Lake Scugog, Ontario, on October 7, 1926, was killed in Tuckerton Bay, eight miles south of Beach Haven, New Jersey, sometime before January 2 and 7, 1928.

BLACK DUCK, No. 457,628, banded by H. S. Osler, at Lake Scugog, Ontario, on October 8, 1926, was found dead in a trap by a resident of Ennismore, Ontario, about April 14, 1928.

BLACK DUCK, No. 457,818, banded by H. S. Osler, at Lake Scugog, Ontario, on October 12, 1926, was killed at a place near Waverly, Georgia, on January 30, 1928.

BLACK DUCK, No. 464,186, banded by H. S. Osler, at Lake Scugog, Ontario, on October 15, 1926, was shot at Owensboro, Daviess County, Kentucky—reported on January 13, 1928.

BLACK DUCK, No. 464,239, banded by H. S. Osler, at Lake Scugog, Ontario, on October 18, 1926, was killed in Chincoteague Bay, by a resident of Chincoteague, Virginia, on January 11, 1928.

BLACK DUCK, No. 464,247, banded by H. S. Osler, at Lake Scugog, Ontario, on October 19, 1926, was killed at a place near Spring Valley, Illinois, on October 27, 1927.

BLACK DUCK, No. 464,259, banded by H. S. Osler, at Lake Scugog, Ontario, on October 24, 1926, was recovered at a place two miles west of Brownstone, Indiana—reported on January 7, 1928.

BLACK DUCK, No. 464,284, f., banded by H. S. Osler, at Lake Scugog, Ontario, on October 26, 1926, was shot on the Scioto River, seven miles above Chillicothe, Ohio, on November 19, 1927. The bird was reported as a mallard.

PINTAIL, No. 322,407, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on January 23, 1926, was shot at a place about six miles west of Cando, Saskatchewan—first reported on January 2, 1928.

PINTAIL, No. 367,230, banded by F. W. Robl, at Ellinwood, Kansas, on February 25, 1926, was killed at a place near Great Slave Lake, Northwest Territories, during the fall of 1927.

PINTAIL, No. 380,454, m., banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on November 8, 1926, was shot at Rearville, Alberta, 140 miles east of Calgary, reported on September 24, 1927.

LESSER SCAUP DUCK, No. 464,376, banded by H. S. Osler, at Lake Scugog, Ontario, on October 26, 1926, was shot on the north shore of Lake Scugog, between Kings Point and Port Hoover, Ontario (Victoria County)—reported on November 25, 1926.

LESSER SCAUP DUCK, No. 464,378, banded by H. S. Osler, at Lake Scugog, Ontario, on October 26, 1926, was shot in the same locality on November 1, 1926.

LESSER SCAUP DUCK, No. 464,381, banded by H. S. Osler, at Lake Scugog, Ontario, on October 26, 1926, was shot in the same locality during the month of October or November, 1926.

LESSER SCAUP DUCK, No. 464,384, banded by H. S. Osler, at Lake Scugog, Ontario, on October 26, 1926, was shot in the same locality during the month of October or November, 1926.

LESSER SCAUP DUCK, No. 464,405, banded by H. S. Osler, at Lake Scugog, Ontario, on October 29, 1926, was shot in the blinds owned and operated by the Onslow Rod and Gun Club on French's Creek where it empties into the New River, Onslow County, North Carolina, on January 10, 1927.

LESSER SCAUP DUCK, No. 464,408, banded by H. S. Osler, at Lake Scugog, Ontario, on October 30, 1926, was killed by a resident of Cherry Point, North Carolina, on December 7, 1927.

LESSER SCAUP DUCK, No. 464,419, m., banded by H. S. Osler, at Lake Scugog, Ontario, on November 2, 1926, was killed at a place near Neavitt, Maryland, on November 25, 1927.

LESSER SCAUP DUCK, No. 464,422, banded by H. S. Osler, at Lake Scugog, Ontario, on November 2, 1926, was shot at the mouth of the Detroit River, on December 3, 1926.

LESSER SCAUP DUCK, No. 464,428, banded by H. S. Osler, at Lake Scugog, Ontario, on November 6, 1926, was killed at Lake Verrett, in Assumption Parish, about 10 miles from Napoleonville, Louisiana—reported on January 8, 1927.

LESSER SCAUP DUCK, No. 464,442, banded by H. S. Osler, at Lake Scugog, Ontario, on November 7 (?), 1926, was killed in the same locality on November 3, 1926.

LESSER SCAUP DUCK, No. 464,443, banded by H. S. Osler, at Lake Scugog, Ontario, on November 7, 1926, was shot on Lake Scugog, near Fenelon Falls, Ontario, on November 8, 1926.

LESSER SCAUP DUCK, No. 464,447, banded by H. S. Osler, at Lake Scugog, Ontario, on November 7, 1926, was shot at Summit Lake, via Ombabika, Ontario, on May 15, 1927.

LESSER SCAUP DUCK, No. 464,450, banded by H. S. Osler, at Lake Scugog, Ontario, on November 8, 1926, was killed in Core Sound, North Carolina, on January 12, 1927.

LESSER SCAUP DUCK, No. 464,452, banded by H. S. Osler, at Lake Scugog, Ontario, on November 8, 1926, was shot in the same locality during the month of November, 1926.

LESSER SCAUP DUCK, No. 464,456, banded by H. S. Osler, at Lake Scugog, Ontario, on November 8, 1926, was "found while gunning" at a place 15 miles south-west of Cambridge, Maryland—reported on November 22, 1926.

LESSER SCAUP DUCK, No. 321,503, ad., m., banded by S. M. Batterson, at Mohler, Oregon, on December 20, 1926, was found dead and half eaten, at Nicola Lake, British Columbia, during the week of April 11, 1927.

LESSER SCAUP DUCK, No. 321,545, banded by S. M. Batterson, at Mohler, Oregon, on December 21, 1926, was killed on Isle Lake, about one mile southwest of Lake Isle Pumphouse, Alberta, 59 miles east of Edmonton, on October 15, 1927. The bird was reported as a male.

RING-NECKED DUCK, No. 464,415, banded by H. S. Osler, at Lake Scugog, Ontario, on October 30, 1926, was killed in Section 28, Township 27 south, Range 36, east of the Tallahassee meridian in Brevard County, Florida, on December 22, 1926.

WHISTLING SWAN, No. 387,417, banded by Chester K. Brooks, at Mentor, Ohio, on April 27, 1926, was killed at a place 5 miles north of the Hudson's Bay Company's Post at Split Lake, on May 18, 1928. Split Lake is 26 miles northwest of Mile 279 on the Hudson Bay Railway, Manitoba.

FLICKER, No. 265,752, ad., f., banded by P. S. Walker, at Vancouver, British Columbia, on December 12, 1926, was evidently wounded in the wing, caught in a hedge, taken into a house and cared for in the same city on November 6, 1927, and died on November 9, 1927.

STELLER'S JAY, No. 286,771, ad., banded by P. S. Walker, at Point Grey, British Columbia, on December 4, 1926, was re-caught in the same trap, on March 26, 1927, and was found dead in the same locality on December 18, 1927.

BRONZED GRACKLE, No. 314,288, f., banded by Hoyes Lloyd, at 406 Queen Street, Ottawa, Ontario, on May 16, 1926, was caught at 428 Slater Street, Ottawa, Ontario, on April 27, 1928.

BRONZED GRACKLE, No. 442,171, juv., banded by Claude E. Johnson, at Ottawa, Ontario, on July 21, 1926, was killed in a peanut field, in Bertie County, North Carolina—reported on February 27, 1928.

WHITE-THROATED SPARROW, No. 185,445, juv., banded by Ralph E. DeLury, at Ottawa, Ontario, on August 13, 1926, was killed, apparently by a rat, in the same locality, on August 15, 1926. The feathers and band only of the bird were found.

SONG SPARROW, No. 166,971, banded by Charles H. Preston, at Danvers, Massachusetts, on March 23, 1926, was found dead on a farm at Fraser's Mills, Antigonish County, Nova Scotia, about April 1, 1928.

SONG SPARROW, No. 185,433, juv., banded by Ralph E. DeLury, at Ottawa, Ontario, on August 7, 1926, was recaptured at the same station on August 18, 1926, and was recaptured at the same station on April 10, 1927, when it choked on a millet seed and died.

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CONTENTS

	PAGE
Notes on a Devonian Plant and Other Observations on a Visit to Cross Point, Gaspé. By F. J. Alcock	47
The Brown Creeper and Other Birds Wintering on St. Helen's Island (Montreal). By L. M. Terrill	50
Birds of a Suburban Garden—Additional Notes. By R. Owen Merriman	51
Contribution to the Knowledge of the Avifauna of North-Eastern Labrador. By Bernhard Hantzsch	52
Notes and Observations:—	
On the Question of "Is It Right to Protect the Female of the Species at the Cost of the Male?". By E. Raymond Hall	59
Barn Swallows. By Mrs. Susan K. Squires	59
The Pileated Woodpecker. By Mrs. Susan K. Squires	61
The Red-headed Woodpecker in Ottawa. By Alice and William H. Lanceley	62
Black Tern at London, Ontario. By E. M. S. Dale	63
The Dowitcher at London, Ontario. By E. M. S. Dale	63
The European Hare, a New Mammal for Toronto. By Jas. L. Baillie	64
In Memoriam—Col. W. P. Anderson. By Dr. H. B. Small	64
Book Review—A Journey Into the Past. By E. M. Kindle	65
Official Canadian Record of Bird-Banding Returns	67

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*NOTES ON A DEVONIAN PLANT AND OTHER OBSERVATIONS ON A VISIT TO CROSS POINT, GASPÉ**

By F. J. ALCOCK

IT frequently happens that a line of investigation leads the inquirer to facts about other problems which are entirely distinct from the one concerning which he is collecting information. The writer had an illustration of this one day during the 1927 field season and his experiences on this occasion serve as the subject matter of these notes.

In the month of June some mineral claims were staked near Cross Point on the Gaspé coast opposite the town of Campbellton, New Brunswick. The ore consists of silver-bearing galena with zincblende occurring in porphyritic volcanic rocks of Lower Devonian age. After examining these showings, the writer was taken to see some samples of petrified plant remains, which had been found in a quarry of conglomeratic sandstone on the farm of William Busteed, about two miles west of Cross Point. In the top of the rock cliff about eighty feet from the ground is a cylindrical projection about four feet in diameter which was thought to be a part of the same trunk which had supplied the specimens which had previously been collected. Late in July a second visit was made to the quarry to see if it were possible to secure portions of the fossil plant for museum purposes.

The Busteed farm is charmingly located on the shore of Chaleur Bay not far from Point Bordeaux. From the house a view through a grove of huge poplars can be had of the main Gaspé road, the Bay beyond, and the New Brunswick shore on the opposite side. The house is on the site of an old French fort which in the days of the old Regime defended the Restigouche region. A depression extending about parallel to the shore between the house and the road is said to mark the site of part of the old foundations of the fort.

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Part of a fossil tree in place in conglomerate sandstone on the shore. The specimen outcrops just above the hammer.

It was in front of this fort that the last battle between the English and French for the possession of Canada was fought in the year 1760. An English fleet, under the command of Captain Byron, father of the poet, drove a French fleet up the Bay, engaged them under the fort's guns sunk them and captured the fort. The old hulks of the sunken French frigates until quite recently could still be seen and through the kindness of Mr. Busteed the writer was given a piece of oak from one of them.

Relics of still earlier warfare can be picked up which appeal more to the archæologist than to the historian. Stone arrow heads of excellent workmanship have been found on the farm and a short time before the writer's visit an exceedingly fine example of a polished axe-head was discovered. This weapon is composed of what is apparently dense yellowish rhyolite and though its rear portion is broken, the blade is in perfect condition. These weapons are supposed to be of early Micmac origin.

Since the main object of this visit was to secure specimens of the fossil plant, the greater part of the day was spent in studying the formation in which it occurs and in endeavoring to secure as much as possible of the petrified trunk for the Museum. Several excellent specimens had been collected by the Busteeds and taken to their house. One fragment shows a diameter of fifteen inches. It is black and hard consisting now of silica. Some of the fragments show good ring structure. Another striking feature is the presence of transverse ridges or nodes with knots or cavities suggesting places where small branches had been broken off. Most of the specimens came from a cliff a couple of hundred yards east of the house and just north of the main road. Road material and rock for ballast for new piers had recently been taken from the quarry. The rock is sandstone and pebbly conglomerate. One excellent specimen from this place, about one foot in diameter and about fifteen inches long was given the writer. Several other large fragments are said to have been loaded with slabs of sandstone to serve as ballast for the new pier at Tidehead. It is a pity that material less valuable from the scientific point of view had not been used instead for this purpose.

The quarry which supplied the specimens of fossil wood. Note the cylindrical projection of rock upon which Mr. Busteed is standing.

As already mentioned, there projects from the top of the sandstone cliff a cylindrical mass of rock which was thought to be the main trunk of the fossil plant which had supplied the other fragments. The diameter of this mass is about four feet. Detailed examination, however, showed that it did not consist of fossilized plant material but was merely a weathered form of the sandstone. Similar rounded masses of rock were observed in other parts of the quarry but none with so regular an outline.

Though no examples of fossil remains are now exposed in the cliff, at least so far as the writer observed, along the shore below the quarry an exposure of a fossil trunk can be seen outcropping in conglomeratic-sandstone forming a low cliff

about ten feet high. A part of this about twenty inches long and ten inches in diameter which was taken out by Mr. W. Busteed was given the writer. The two specimens secured for the Museum consist, therefore, of two parts of two distinct individuals occurring in outcrops separated stratigraphically by over one hundred feet at least.

What kind of a plant was this when it was living and when did it live? The second of these questions can be answered more readily than the first. The formation in which the specimens were found is the Gaspé sandstone of Middle Devonian age. This formation covers wide areas in the middle of Gaspé. Its lower beds contain marine fossils of Hamilton age so that the age of the series is definitely fixed. The upper horizons are barren of fossils except for local occurrences of *Psilophyton* a primitive plant. Fragments of *Psilophyton* occur in shaly layers in the sandstone quarry where the specimens of the fossil trunks were found so that the correlation of this sandstone with the Gaspé is conclusive. The series is greenish-grey to buff in color. In the quarry the beds are tilted, the strike being north-east and the dip fifty-five degrees to the south-east. The series is cross-bedded, slickensided and faulted.

The first person to discover fossil plants of this type in the Gaspé sandstone series was Sir William Logan, the founder of the Geological Survey of Canada, during his first explorations in this country. His discoveries were made on the shores of Gaspé Bay. Later Sir William Dawson became interested in the specimens which Logan had collected and in 1858 and again 1869 made visits to Gaspé to study the localities where specimens were known to occur. Dawson also visited the quarry on the Busteed farm near Point Bordeaux. Other specimens were discovered by Dr. Robert Bell during his explorations along rivers in the interior of Gaspé.

In his earlier descriptions, Dawson named these forms *Prototaxites* on account of the resemblance of their tissue, as revealed by microscopic study, to certain Taxine woods. The name, however, suggests that the plant is an early conifer and on this account it was changed in later descriptions to *Nematophyton*. A full description of these forms by Dawson and Penhallow is given in the Transactions of the Royal Society of Canada for 1888. Their conclusion is that though there are no modern plants with which these forms are strictly comparable, *Nematophyton* is undoubtedly an alga.

The interesting feature is that we have here what is probably a very early land plant. It grew upright probably under marshy conditions. Whether fresh or salt water was present is difficult to say but the absence of marine fossils suggests that the deposits were probably not marine. The forms must have been large. One trunk has a diameter of two feet five inches which must have meant a form of considerable height. They must also have been strong and rigid. Even though buried under a cover of sand and gravel and subjected to the pressure of a great mass of overlying sediments, the trunks were but little compressed. Do these forms represent the earliest land forest, not of trees, for they do not show wood fibres, but of giant land algae?

During this brief visit to Cross Point the writer has occasion to investigate another geological problem and one of quite a different nature. About two miles west of the Busteed farm is a huge boulder which local tradition says is a meteorite which fell many years ago. This rock is on the side of a hill on the farm of Mr. F. Adams, postmaster at Broadlands. Above it is a groove over one hundred feet in length, along which it evidently slid to its present position. It is about ten feet long, seven feet wide and from three to five feet thick with an estimated weight of about twenty-five tons. It is subangular in outline with no sign of any fused surface. In appearance it is like many of the dense volcanic rocks of Lower Devonian age which form most of the high hills of this part of the Gaspé coast. A thin section was cut from a specimen of it and it proved under the microscope to be an andesite. The evidence is therefore against the local tradition of its being a meteorite. It is evidently merely a glacial erratic which was pushed down the hillside by ice action in Pleistocene times and in its progress it gouged out the depression which appears above it.

THE BROWN CREEPER AND OTHER BIRDS WINTERING ON ST. HELEN'S ISLAND (MONTREAL)

By L. M. TERRILL

SITUATED in the St. Lawrence River, between Montreal and the South Shore, lies St. Helen's Island, practically the only hilly land in the immediate vicinity of Mt. Royal.

Although within the shadow of the city few citizens are familiar with its winter aspect. During the summer "The Island" is a picnic ground, but after the close of navigation the swift St. Mary's current usually isolates it from Montrealers and only South Shore residents take advantage of the skiing and sliding afforded by its slopes.

The popularity of The Island in the summer months as a children's playground may affect the abundance and variety of its bird life at that season, while its isolation and the relative absence of human beings during the winter no doubt have a bearing on the winter bird population.

Islands are notedly attractive to migrant owls mainly because the scarcity of predatory mammals is conducive to an abundance of rodents. For small land birds, crossing a waste of water or ice, an island must be in the nature of an oasis and many birds of sedentary habits, such as the Brown Creeper, no doubt find it an irresistible magnet.

During the past three winters I have made periodical visits to St. Helen's Island and have habitually found the creeper wintering there. They and the Black-capped Chickadees are the most dependable of birds whereas the creeper is rarely seen on the mainland at this season. Of course the creeper is easily overlooked. It requires an experienced ear to detect the wiry, lisping call and a keen eye to mark the bird as it drifts like a scrap of loosened bark from the top of one tree to the foot of another—a magnetized bit of flotsam gravitating towards the mother-lode. Notwithstanding this handicap I feel assured that the Brown Creeper is an uncommon winter resident in the district and these island records are therefore unusually interesting.

St. Helen's Island in my opinion is better suited to the creeper's needs than the neighbouring mainland, where the tree growth is largely composed of small smooth-barked species—notably white birch, poplar, maple and beech. As its name implies, the tree creeper is especially fitted to probe for the minute eggs and larvæ of insects hidden in the crevices of tree trunks and it naturally seeks rough-barked trees like the elm. The relative abundance of such trees on The Island is, I am confident, one of the chief attractions. In this connection it is interesting to note that the hackberry is one of the outstanding trees and that I have not observed it elsewhere. It is a southern tree and Montreal is thought to be the extreme limit of its range in the north-east. The hackberry somewhat resembles the elm in the quality of its fibre and in the roughened bark of its trunk. Otherwise it bears an aromatic, cherry-like fruit about the size of a choke cherry, which matures late in the season and persists through the winter.

The presence of sheltered ravines on St. Helen's Island probably also has a bearing on the prolonged stay of the creepers, but apart from these features I believe that the creeper and other species of sedentary habits such as nuthatches and woodpeckers, are loath to leave the island oasis as long as there is sufficient food. On the mainland their course would take them from tree to tree and from wood to wood and they might cover great distances during their winter wandering, but here on this island their movements are circumscribed. One can well imagine these hard-working visitors, near-sighted from the exacting nature of their task, following the tread of their insular treadmill and encircling the island again and again in preference to venturing out over the ice floes.

My observations indicate that this island coterie of insectivorous birds is practically unchanged throughout the winter, at least during January and February. Although their numbers have varied from year to year there is scarcely any change during a single winter. Only on the approach of spring, prompted by the nearness of the mating season or a scarcity of food, or by both of these factors, do the birds leave the island. St. Helen's Island, or any similar island, offers an interesting opportunity to the bird bander. Perhaps someone with sufficient time and enthusiasm will eventually prove by this means whether or not the individuals in a community of this nature actually remain throughout the winter, and what proportion of them return in succeeding years.

Following is a list of the birds observed on St. Helen's Island during the past three winters. The figures denote the greatest number of each species seen in a single day. Goshawk, 1927 (1); Snowy Owl, 1926 (1), 1927 (1); Screech Owl,

1927 (1); Great Horned Owl, 1928 (1); Hairy Woodpecker, 1926 (2), 1927 (3); Downy Woodpecker, 1926 (1), 1927 (4), 1928 (3); Starling, several in 1927 and 1928. These birds were probably foraging bands from a large flock wintering near a dumping-ground on the outskirts of St. Lambert where upwards of 100 were counted on several occasions. Practically all of the mountain ash berries on the South Shore have already been eaten by starlings which are now turning their attention to hackberries and haws. Evening Grosbeak: Noted on February 18th and 19th (1928). On the latter date 16 were seen, ten of which were adult males. They were feeding on hackberries (or their kernels) and as many of the remaining berries were on the outermost twigs which would not bear the grosbeaks' weight, the birds were forced to hover like kinglets. Pine Grosbeak, 1927 (1 flock); Redpoll, 1927 (1), 1928 (1 flock); Northern Shrike, 1927 (1); Brown Creeper, 1926 (15), 1927 (10), 1928 (12); White-breasted Nuthatch, 1926 (2), 1927 (2), 1928 (2). These birds are nearly always seen in couples. Probably these couples are paired birds though I do not know whether it has been established that nuthatches remain paired throughout the year. In these days one is often in doubt whether the yoke is conjugal or merely companionate. In any event, the fact that only two birds were noted each winter, one always following in the wake of the other, points to the likelihood that at least they were the same individuals.

Black-capped Chickadee, 1926 (a number), 1927 (12), 1928 (25); Robin, 1928 (1).

There are dense patches of hawthorn bushes on the island which still bear an abundance of fruit. These bushes furnish food and shelter for this robin which has apparently wintered here. I also have reports of four robins wintering elsewhere in the district of Montreal.

Domestic Sparrow: Always a few present.

BIRDS OF A SUBURBAN GARDEN—ADDITIONAL NOTES

By R. OWEN MERRIMAN

IN *The Canadian Field-Naturalist* for November, 1922, (vol. XXXVI, No. 8, pages 146-149), the present writer placed on record the birds which had been observed in a garden of about five-sixths of an acre on the Niagara escarpment just outside of the city of Hamilton, Ontario. As the close observation of birds within this area, which had been maintained without interruptions of more than a few days since the spring of 1907, came to an end with the removal of the writer in April, 1927, and as it is not likely to be re-established, it seems wise to record the additional observations made since the former article was written.

For a description of the small area of these observations, the reader is referred to the former article. The area and some of its birds in two seasons are shown in two reels of motion pictures entitled "Bird Neighbours in Winter" and "Bird Neighbours in Summer." These pictures were taken in 1924, by a photographer of the Department of Trade and Commerce, for the Canadian National Parks Branch of the Department of the Interior.

In some cases the new notes which follow probably show new birds for the area, but in other cases they show only the observers' greater success in separating similar species in the field or in noticing shy species. The previous record of thirty-four species in five hours on May 20, 1920, was surpassed more than once in later years; and the record for one day now stands for May 19, 1923, when the combined lists of two observers in the garden included forty species.

The following notes are on species which were included in the previous list, from which a significant phrase is quoted in parenthesis in each case, to show the changes made by the new observation. The numbers also refer to the previous list.

3. GREAT BLUE HERON. ("One bird observed flying over".) Two additional similar records.

10 or 11. CUCKOO species ? (Yellow-billed, "seen every year, but infrequently;" Black-billed "seen occasionally every year.") A pair (sp. ?) nested in the hedge within a yard of the public sidewalk in July, 1923, where they were undiscovered until the hedge-trimmer exposed the nest and eggs which were thereupon deserted.

37. EVENING GROSBEAK. ("January, 1920.") One male was seen in the area on May 6, 1926, and recorded in *The Canadian Field-Naturalist*, vol. XL, No. 7.

43. SAVANNAH SPARROW. ("One record.") Recorded only twice more, in May, 1923, and 1926 although it continued to be a common breeding bird within a quarter of a mile and its song was frequently heard from the area every spring and summer. The scarcity in the area of Savannah and Vesper Sparrows and Mourning Dove, com-

monly breeding in the immediate vicinity, is noteworthy.

46. TREE SPARROW. ("Rare winter visitor.") More often seen in 1925, 1926 and 1927.

51. SWAMP SPARROW. ("One record.") Again recorded during the spring migrations in 1924 and 1925.

55. INDIGO BUNTING. ("Formerly seen frequently, but rarely seen in last ten years.") Seen recently only in 1922 and 1925, when solitary males were seen, although the species is still common, breeding a few miles away.

67. NORTHERN PARULA WARBLER. ("Several spring records but none since 1919.") Not uncommon during the spring migrations in 1923, 1924 and 1926.

68. CAPE MAY WARBLER. ("Several spring records in recent years.") A common spring migrant after 1923.

75. BAY-BREASTED WARBLER. ("Uncommon spring migrant.") Unusually common towards the end of May, 1925.

76. BLACK-POLL WARBLER. ("One or two seen each spring.") Also common during the latter part of May, 1925.

78. BLACK-THROATED GREEN WARBLER. ("Uncommon spring migrant, one fall record.") More often seen during the spring migrations in 1923, 1924 and 1925, and recorded once again in the fall of 1924.

83. WATER-THRUSH. ("One spring record.") Seen again in the spring and fall of 1924.

84. MARYLAND YELLOW-THROAT. ("Common spring migrant.") One fall record, October 2, 1924.

85. WILSON'S WARBLER. ("Records only for spring in last two years.") Common each spring thereafter.

91. WINTER WREN. ("Spring records in three recent years.") Seen again in the spring of 1923.

Ten new species were seen in the area after the publication of the previous article, making a total of one hundred and fourteen species identified in this garden between May 1, 1907, and April 13, 1927. The additional species are here numbered consecutively with the previous list.

105. *Zenaidura macroura*. MOURNING DOVE. —One record, see remarks on Savannah Sparrow, above.

106. *Empidonax trailli alnorum*. ALDER FLYCATCHER.—Identified positively only on May 29, 1925.

107. *Sturnus vulgaris*. STARLING.—First seen in area, May 22, 1926, and commonly thereafter. Bred in vicinity in 1925, see *The Canadian Field-Naturalist*, vol. XXXIX, No. 9.

108. *Pooecetes gramineus gramineus*. VESPER SPARROW.—One record, see remarks on Savannah Sparrow, above.

109. *Melospiza lincolni lincolni*. LINCOLN'S SPARROW.—One record, May 16, 1926.

110. *Cardinalis cardinalis cardinalis*. CARDINAL.—One male seen from the garden on July 7, 1923, and heard in the vicinity for several days thereafter.

111. *Vireosylva philadelphica*. PHILADELPHIA VIREO.—Records September 28, 1923, and in May, 1924, 1925 and 1926.

112. *Vermivora peregrina*. TENNESSEE WARBLER.—May records for 1923, 1924, 1925 and 1926.

113. *Oporornis philadelphia*. MOURNING WARBLER.—May records in 1923, 1924 and 1925.

114. *Bæolophus bicolor*. TUFTED TITMOUSE.— One seen May 28, 1925, the second record of the species for Canada, published in *The Canadian Field-Naturalist*, vol. XXXIX, No. 9.

CONTRIBUTION TO THE KNOWLEDGE OF THE AVIFAUNA OF NORTH-EASTERN LABRADOR

By BERNHARD HANTZSCH

"Beitrag zur Kenntnis der Vogelwelt des nordöstlichsten-Labradors," von Bernhard Hantzsch, *Journal für Ornithologie*, Sechsundfünfzigster Jahrgang (56th annual publication), No. 2, April, 1908, and No. 3, July, 1908. Leipzig. I. Allgemeiner Teil (General Part), pages 175-202. II. Besonderer Teil (Detailed Part), pages 307-392.

(Translated from the original German text in the Emma Shearer Wood Library of Ornithology, Library of McGill University, Montreal, by M. B. A. Anderson, M.A., and R. M. Anderson, Ph.D., Ottawa, 1927.)

(*Continued from page 34.*)

Carpodacus purpureus purpureus (Gm. [p. 382]. *Purpur-Gimpel.*—PURPLE FINCH.

I must mention this species in consequence of the oft-cited specimen, which on 1st September, 1877, came on board the *Florence* during a thick fog at Resolution Island, and was captured and given to Kumlien. According to the report of the Eskimos in Cumberland Sound the species possibly also occurs in the brush-covered shore regions of the great lakes in the interior of Baffin Island (Kumlien, 1879, p. 75). Whether the record of the bird observed by Kumlien on 19th July, 1878-1879, in the mountains north of Cumberland Sound, belonged to this species, or is a printer's error, must remain unknown. In the south of Labrador the Purple Finch is said to occur frequently (Macoun, III, p. 422).

Acanthis linaria rostrata (Coues). [p. 382]. *Grosser dunkler Leinfink.*—GREATER REDPOLL.

Eskimo: *Saksâriak* (*Saksâgiak*), *-âk* (*-riksak*), *-at* (*-ritsat*), (*partim* = to roam around, to be outside, to have no roof; a distinction in the term for different forms of Redpolls does not exist.)

I met this subspecies as a common migrant in northeastern Labrador. In spite of all variation I can nevertheless put all the Redpolls observed, collected, and prepared during my stay there exclusively under this subspecies. There is no evidence of the breeding of the same south of Hudson Strait. It seems to be much more likely to breed in Baffin Island, because ultimately the breeding birds of this district will come first and foremost to northeastern Labrador.

28 skins in my collection, of the time from 10th to 20th September, 1906, show no striking differences in size between the different degrees of age and between the sexes. The moulting of the contour feathers is to be sure not yet finished, but tails and wings would scarcely have developed any further. Weight in flesh: 15.4-23 g. Total length: 132-145 mm. Spread of wing: 218-238. Tail: 60-67. Tail+wing: 25-32. Length of bill: 9-10.2. Depth of bill at base: 6.3-7.8. Tarsi: 14-16.8. Middle toe [p. 383] including the 4.8-8 mm. long claw: 13-16.5 mm.

Iris: dark brown. Bill: dark yellow; ridge (culmen) and point of beak more or less extensively blackish. Feet: gray-black.

Six stomachs contained sand and little quartz grains, as well as unbroken, cracked, and in part germinated seeds (Rörig). In part I ascertained the plant species concerned in a state of nature; partly I investigated contents of crops and stomachs. There were taken out the seeds of *Polygonum viviparum* L. (the most numerous), *Stellaria cerastoides* L., *Cerastium alpinum* L., *Saxifraga cæspitosa* var. *grœnlandica* (L.), *Papaver nudicaule* L., as well as of a grass, either *Festuca ovina* (L.), or *Poa alpina* L.

Of eleven Mallophaga collected, three female belong to *Docophorus communis* Nitzsch, and six females, two males to *Colpocephalum chrysæum* Kellog (T. Müller).

Up to September 6th, I observed no Redpolls, although they were said to have been seen some days before; from then on, scattered individuals appeared almost daily. I was lingering at that time on the islands on the Atlantic side of Labrador. The birds came in little bands, betraying themselves from afar by their sharp, lively *Schütt*, *Schüttschütt*, *Pschütt*, *Pschütt*, often nearly *Tititit*, *Tütütüt*, or this drawn out even longer, more rarely the beseeching, prolonged, pleasant *Düi*, which is produced more while sitting. The first arrivals flew so high, that one frequently could only hear them but not see them, and they were exceedingly restless, wild, and shy. In spite of much pains an old male did not come within range until 10th September. After 13th September the birds gradually appeared in greater numbers, behaved more quietly, and were tamer, so that about 20th September one could come within a few meters distance. They were hunting up places with an abundance of seeds and liked to be near human habitations, where we then at times met scattered bands of 50 to 100 members which were busily hunting food and had crop and stomach stuffed full of little grains. As a result, many specimens were also very fat. The little creatures rustled about on the ground like mice, particularly to gather up the fallen seeds, then flew up in the air a little way, settled down again immediately among the plants and were almost always in activity and motion. Only seldom does one see them taking their rest on stones or small hills. Often they share their haunt with the Lapland Longspurs (*Calcarius*), far less frequently with other species. In the middle of September the Redpolls were the most abundant small birds at Killinek; from the end of the month they quickly became infrequent. When a rather heavy fall of snow began in October, they disappeared completely, but I met some very shy bands which apparently belonged to this species, on 13th October in the bushes at Rama; then no more again in Labrador. On the spring migration they are said to come also in numbers at Killinek, and the males then to be coloured a splendid red on the breast.

Acanthis linaria fuscescens (Coues).[68] [p. 384]. *Labrador Leinfink.*—LABRADOR REDPOLL.

Eskimo: *Saksâriak*, *-âk*, *-at* (*partim*).

Although according to report of the natives no Redpolls breed in the narrowest limits of our district, because every sort of bush growth is lacking, to the south of it and farther down on the east coast of Labrador, a very dark form of Redpoll appears as a very abundant breeding bird, which Coues, in *Proc. Acad. Nat. Sci. Phila.*, 1861, pp. 222, 380, etc., has sufficiently distinguished from the European *A. l. linaria* (L.). I consider this separation as justified, even if most of the Americans, with the distinguished Ridgway at the head (The Birds of North and Middle America, I, 1901, pp. 88-9) do not recognize it.

In the southwest of Ungava Bay the western representative of our subspecies, *A. l. exilipes* (Coues)[69], appears breeding. In the geographical transition district between both forms there are

[68]This subspecies is not recognized by the A.O.U. Check-List, 1910, or subsequent supplements. The form in question is undoubtedly *Acanthis linaria linaria* (Linnæus), Common Redpoll, which is regarded as a form inhabiting the northern parts of both hemispheres.—R.M.A.

[69]Placed in A.O.U. Check-List, 1910, as *Acanthis hornemanni exilipes* (Coues), Hoary Redpoll, a subspecies of the Greenland Redpoll, *Acanthis hornemanni hornemanni* (Holboell).—R.M.A.

apparently also intermediate forms . Whether joining our district on the north, in Baffin Island, which indeed shows slight bushy growth in places, *A. l. rostrata* (Coues) is indeed the breeding bird, may be left aside for the present. But the breeding of this form in our restricted district can not be established in any way. W. Raine's assertion, that he had eggs of *A. l. rostrata* from Ungava Bay (Macoun, III, p. 440), does not change anything in this regard, since it is naturally quite impossible to designate any one of our bird forms from the eggs. The Redpoll eggs secured by the Canadian *Neptune* Expedition in 1904 at Killinek (Low, 1906, p. 319) certainly do not come from Cape Chidley, but may have been brought up from the south. How far this subspecies ranges around northward in our own district outside of the breeding periods, is not known. On my journey I have apparently received none of these breeding birds of eastern Labrador in my possession.

NOTE: For the present I can not believe in the occurrence of *Acanthis linaria holbœllii* (Brehm) in our district. An identification of this subspecies on basis of some measurements alone, as Ridgway, for example, has done with that specimen collected among other Redpolls by Kumlien in Cumberland Sound (Kumlien, 1879, p. 76), I consider rather risky.

Acanthis hornemanni hornemanni (Holb.). [p. 384]. *Grosser heller Leinfink.*—GREENLAND REDPOLL.

Eskimo: *Sakâsriak, -âk, -at (partim).*

This species is generally designated as an abundant winter visitor of northern Labrador (Cf. Ridgway, Birds of North and Middle America, I, p. 81; Chapman, Birds of Eastern North America, p. 284; Macoun, III, p. 435, etc.). On other pages, it is emphasized [p. 385], on the contrary, that this far northern Redpoll is far more a resident bird than a bird of passage and migratory bird, and winters in the highest latitudes (Cf. H. Winge, Grönlands Fugle, p. 292). From the inhabitants of our district I could learn nothing certain about the occurrence of large, pale Redpolls at that place. Since the neighbourhood is very unfavourable for small birds in the winter, on account of its scanty plant growth these birds may perhaps betake themselves more to the far richer region south of Ungava Bay, to which most of the records in the literature refer.

Passerina nivalis nivalis (L.)[70]. [p. 385]. *Schnee-Ammer.*—SNOW BUNTING.

[70]*Plectrophenax nivalis nivalis* (Linnæus) of A.O.U. Check-List, 1910.—R.M.A.

Eskimo: *Amauligak, -gak, -gat* (from *Amaulik* =male of the Eider, because the male of our species in summer plumage has a certain similarity to this, *-ligak*=to be provided with something lasting.

The Snow Bunting is the most widely spread and also in places a rather abundant breeding bird of our district. The rocky terrain and the scanty plant-growth are quite satisfactory to the unassuming little creatures; all possible insects and other little creatures, as well as seeds and berries serve them for food. For a dwelling it chooses a rock crevice or a hole in the ground, such as are to be found everywhere in abundance. Southward, the Snow Bunting breeds at least to the south of Ungava Bay; on the Labrador coast not very far above Nain. As a migrant, however, the birds often occur in the whole of Labrador in great numbers.

32 Labrador skins of my collection, 30 of them collected by myself from 6th August to 20th October, show the following measurements:

Weight in flesh: 31.8-52.1 g. Total length: 154-182 mm. Spread of wing: 304-340. Wing 96-112. Tail: 63-82. Tail+wing: 20-23. Bill 10.2-12. Tarsi: 18-22. Middle toe including the 4-8.1 mm. long claw: 18-22 mm. The greatest measurements in general have reference to old males, but by no means exclusively.

Iris: dark brown; in juvenile, dusky gray-brown. Bill: more or less bright, dusky gold-yellow; tip and also most of culmen, blackish; inside also yellow; in juveniles upper mandible heavily mixed with gray, the rest yellowish. Feet: black; soles yellowish; in juveniles, dull blackish-gray to dark lead-gray, soles pale yellow.

Nineteen stomach contents show, in 15 cases sand; in 6 cases little black pebbles; in 4 cases unidentifiable organic remains, distinctly of insects; in one case black chitin remains, finely ground remains of beetles, a fly; in two cases an owl-butterfly of which one was with eggs; besides in 14 cases different seeds (Rörig), of which as species I recognized *Polygonum viviparum* L., *Oxyria digyna* Hill., *Stellaria cerastoides* L., *Cerastium alpinum* L., *Erigeron uniflorus* L., and *Saxifraga cæspitosa* var. *grœnlandica* L.

Of seventeen Mallophaga collected, one male and one female belonged to *Docophorus communis* Nitzsch (p. 386); three males, ten females, three larvæ, to *Colpocephalum chrysophæum* Kellogg (T. Müller).

The Snow Buntings are in no way so abundant in our district that one meets them during the breeding season on every excursion, but they never seem to be entirely lacking. During the month of August I observed the old ones with the gray-coloured young ones from which the first soft, almost woolly plumage rapidly goes away and is therefore rare in collections. At first glance these creatures seem like a quite different bird species, but they usually act so tamely that they can be shot at leisure. They are graceful little creatures, with which I often entertained myself

for minutes and which I lured up within one to two meters. They hop curiously about the person who is sitting quietly, often making low bows and balancing their tails. Their note is the quite charactersitic, hard, rolling, harsh *Tiriri*, seldom the softer *Pj*, *Pjü*. The watchful adults notice, to be sure, what a dangerous large being their silly youngsters are taken up with, and they soon begin to call them away. Often old and young are almost equally tame, when through quiet manner and by imitation of their note they are not frightened. From the end of August the families of smaller ranges gather in bands and vanish toward the south. Until the end of September the Snow Buntings were then rather rare, while the other small birds passed through in numbers. Not until after this time did large flocks appear and now remained by far the most abundant small bird through all of October. If bands of this species were engaged in migration, they showed themselves so shy, restless and flighty that it was not easy to shoot a specimen from them. On the contrary, where they were resting in places for a longer or shorter time on account of weather or food, they seemed in general quite tame, occasionally as much so as at the breeding place. Industriously, they incessantly utter their call-notes, which one very soon learns to distinguish from those of the other small birds: either the rough, trilling, short *Tiriri*, or the euphonious and loud *Pet*, *Pjüt*, *Pjü*, *Piü*, *Pj*, with which often an alluring, rolling sound, *Trrr*, is connected. Somewhat more rarely one hears slower and more pleasantly *Piri*, *Pirui*, *Birui*, or the like.

Many a one of the tame migrating visitors is caught by Eskimo boys lying in ambush, and several times such black-eyed fellows, glowing with joy and hunters' zeal, brought me flapping creatures of this species. They could apparently not understand, when I stroked their long, waving hair from their foreheads in a friendly manner, caressed the hot, brown cheeks, gave them a little reward, and then in case it was not injured, let the dishevelled bird fly again. "We men hunt differently; did that for you!" The Eskimo dogs are also said [p. 387] to surprise some of the birds, the real beasts of prey stalk them systematically. The Eskimo hunters now and then shoot into the dense swarms and cook the fat birds as a delicacy.

Calcarius lapponicus lapponicus (L.). [p. 387]. *Lerchensporn-Ammer.*—LAPLAND LONGSPUR.

Eskimo: *Nessauligak* (*Nassaulegak*), *-gak*, *-gat* (from *nessak* = hood on a man's coat, on account of the head and neck marking, *-ligak* = who is continuously supplied with it).

Infrequent breeding bird of our district, but common migrant. How far southward it breeds is uncertain. When Bigelow asserts, however, that this would only be the case from Nachvak northward (1902, p. 30), he is in error. I myself possess eggs from Rama, which at all events is situated farther south. Weiz also knows the species as a breeding bird for Okak (Townsend and Allen, 1907, p. 395), which record of this missionary is scarcely to be doubted. Turner also notes the Lapland Longspurs as breeding in the south of Ungava Bay (1886, p. 240). It inhabits the neighbouring Baffin Island, according to Kumlien, more frequently in the interior than in the coast regions (1879, p. 77). This is probably also the case for northeastern Labrador.

25 specimens of my collection, of which 20 were from 27th August to 18th October, from Killinek, and 5 from 24th to 28th May, 1907, from Rama, have the following measurments: Weight in flesh: 20.2-32.5 g. Total length: 153-169 mm. Spread of wing: 264-300. Wings: male 91-99; female 84-92.5. Tail: male 65-76; female 62-67. Tail+wing: 25-32. Bill: 10-12.5. Tarsi: 21-23. Middle toe including the 5-7 mm. long claw: 17-20 mm.

Iris: dark-brown. Bill: reddish gray-yellow to brown-red; lower mandible, particularly at the base, often yellowish; tip of bill blackish; in spring in the case of adult male, beautiful light yellow up to the blackish tip. Feet: blackish gray-brown to dark yellowish-gray; heels and soles yellowish.

Eighteen stomach contents showed, in 8 cases, pebbles; in 9 cases sand; in 12 cases insect remains (caterpillars, fly-larvæ, chitinous remains of another insect larva, fly-pupæ, piece of a rather large pupa, wings and legs of hymenoptera, remains of beetles, flies and butterflies); in 1 case crustacean; in 11 cases small seeds (Rörig). The last came from my own investigations, and were of *Polygonum viviparum* L., *Oxyria digyna* Hill., *Cerastium alpinum* L., *Stellaria cerastoides* L., and *Saxifraga cæspitosa* var. *grœnlandica* (L.).

I never certainly observed breeding birds, perhaps only by chance. Not until 27th August did I meet some Lapland Longspurs at Killinek; from this time on, numerous specimens daily. The birds kept loosely together in flights of 15 to 20 individuals at the most. At the beginning they were rather shy [p. 388], later often quite tame. They liked to come near the Eskimo tents and earth houses, which were on comparatively fertile, sunny places with an abundance of water. Here without shyness they hopped about, but apparently paid some attention to the dogs, which snap at the little creatures if opportunity is given. Their food consisted, at this time especially, of seeds of the most different herbs, which they could find in quantity in suitable places. Several times I met the birds on swampy places where brooks rippled through

near the shore of the sea, where they feared the water so little, that they walked through shallow places. Many times the Longspurs mingled with the other small birds in their flights. Their notes were heard quite often: Most characteristic is a pleasant, long or short trilling *Pri, Pirrr*, or the like, which is uttered particularly in flying away; when sitting, one hears more often a soft, somewhat changing *Tiut, Tjut, Tüt*, which, however always remains distinguishable for the species. *Anthus* [the Pipit] has the fine, different kind of *Pit, Sitsit; Passerina* [the Snow Bunting] the rolling, hoarse, trilling *Tiriri* or the more monosyllabic *Pet, Pjüt; Acanthis* [the Redpoll] the harsh *Pschütt, Schütt*. After all, the calls of the birds often resemble each other quite remarkably. From the middle of September on, the flocks of Longspurs became more rare. In October I still met single birds, apparently old males; the last met upon my visit to the Labrador coast on 18th October, at Hebron. The majority of the birds may leave the treeless and bushless districts as soon as a rather heavy snowfall comes.

Passerculus sandwichensis savanna (Wils.). [p. 388]. *Steppenfink.*—SAVANNAH SPARROW.

Eskimo: *Kutsertagusek, -usîk, -utsit* (from *Kutsertak* = *Zonotrichia* (White-crowned Sparrow), *-usek*, = one—in restricted sense, one near; thus freely translated "a little *Kutsertak*.").

The birds abundant throughout all of Labrador have been separated in 1901 by R. H. Howe, Jr., as a distinct subspecies (*Passerculus sandwichensis labradorius*, Contrib. North Amer. Ornith., I, p. 1; compare also *The Auk*, XIX, 1902, p. 85, and *The Auk*, XX, 1903, p. 215). The differences, based especially on measurements, do not agree for my two Labrador specimens, even if I am willing to admit that the wings of breeding females often are rubbed off exceptionally short. The bills of my birds show a considerable length, in contrast to Howe's diagnosis. I can therefore at present not recognize the distinctions, particularly as these appear of the slightest (Cf. Townsend; and Allen, 1907, p. 396)[71]. The Savannah Sparrow seems to seek our district only occasionally at the time of migration. I heard nothing of breeding there. Yet the birds breed up to the southeast of Ungava Bay [p. 389]. I possess also two clutches of eggs from Rama on the coast of Labrador, rather near our district, where the species occurs regularly and is well known to the natives. I never caught sight of a specimen myself.

Two skins of my collection, male and female, breeding birds from Rama, of 8th and 30th June, 1907, show the following measurements: Wing: 71; 65 mm. Tail: 53. Bill: 12.8; 12. Tarsi: 20. Middle toe including the respectively 5 and 3 mm. long claw: 20 and 18 mm. respectively.

Zonotrichia leucophrys leucophrys (Forst.). [p. 389]. *Weisskroniger Ammerfink.*—WHITE-CROWNED SPARROW.

Eskimo: *Kutsertak, -tâk, -tat* (according to report, from *kussertok* = it drops, because the call note is said to sound like drops falling upon water In the translation of the Bible used for "Sparrow."

Occasional visitor in our district, particularly in the southern parts, bordering on the scrub forest. On the other hand, it is probably not a breeding bird in our entirely bushless hill landscapes, even if it occurs as such in numbers up to Nachvak (Bigelow, 1902, p. 30), and in the south of Ungava Bay (Macoun, III, p. 479). During my stay at Killinek I never caught sight of a specimen.

Two skins of my collection, one adult male of May, 1905, from Hopedale, and one of 8th June, 1907, from Rama, show the following measurements: Wing: 81; 83 mm. Tail: 83; 80. Bill: 12. Tarsi: 25; 24. Middle toe including the respectively 6 and 5 mm. long claw; 22 mm.

Setophaga ruticilla (Linnæus). [p. 389] *Amerikanischer Rotschwanz.*—AMERICAN REDSTART.

I mention this bird, which at the best breeds up to the most southern parts of Labrador, because of a communication of C. W. G. Eifrig (*Auk*, XXII, 1905, p. 241) that in 1904 a skin of the bird was brought by the factor of the station at Port Burwell (Killinek) to the naturalist of the *Neptune* Expedition, Mr. Halkett. Townsend and Allen recognize this unique occurrence in our district as authentic (1907, p. 411). Yet it is only a case of an exceptional visitor on this extreme corner of northeastern Labrador, comparable to that of the occurrence of *Tyrannus* [Kingbird].

Anthus spinolettus pensilvanicus (Lath.).[72] [p. 389]. *Pensilvanischer Pieper.*—PIPIT.

Eskimo: *Aviortok, -tûk, -tut* (apparently identical with *avilortok* = one, who knocks on something; on account of the short, rapping call-note.

Abundant breeding bird and migrant; the most widely distributed breeder among the small bird species in the neighbourhood of Killinek, but as a migrant not occurring in such great numbers as the other species. According to agreeing reports, also abundant farther south in Labrador and northward in Baffin Island.

[p. 390]. Eleven specimens of my collection, from 6th August to 13th October show the following measurements: Weight in the flesh: Males, 22.4-25; females, 18.3-22.5 g. Total length: Males, 160-165; females, 139-156 mm. Spread

[71]The A.O.U. Check-List, 1910, and subsequent supplements, have not recognized this proposed subspecies.—R.M.A.

of wing: Male, 265-272; females, 240-258. Wings: Males, 82-86; females, 73-79. Tail: Males, 66-71.5; females, 52-65. Tail+wing: 25-40. Bill: 11-13. Tarsi: 21.5-23. Middle toe including the 4-5 mm. long claw: 16-19 mm. The noticeable differences in size of the sexes are perhaps to be explained by the fact that the males are freshly moulted autumn birds, while the females are breeding birds in the worn summer plumage. The males, indeed, moult considerably earlier than the females. The least measurements refer to a female of 6th August in the first juvenal plumage, apparently finished with the moult.

Iris: dark-brown. Bill: In old birds glossy blackish; in younger ones more black-gray or black-brown; lower mandible, especially on the sides and at the base, flesh-coloured, reddish-yellow, or bright brownish-red. Feet: In the old birds brownish-black; in young ones, tarsi light-brown, yellowish-gray, or flesh-coloured, toes darker brownish-gray; soles of the old birds somewhat lighter, in young ones bright or yellow.

Ten stomachs contained, in 3 cases small pebbles; in 1 case fine black (decayed ?) parts of plants, and some mammal hairs (probably gathered from a cadaver),[73] one small caterpillar, fly-larvæ; in 2 cases unidentifiable black chitinous remains, and in 3 cases respectively other insect remains; in 3 cases remains of beetles and butterflies; in 2 cases of flies (Rörig).

When I entered the country on 5th August, our Pipit was the first small bird which showed itself to me, and which by its lively, even if not particularly loud *Pit, Tsit, Sitsit*, attracted my attention. In the days following, I met the bird, rather frequently in all places where there was an abundance of grass and water, especially on sunny slopes. The young were apparently able to fly everywhere, but were still led by the old birds. All showed themselves watchful and cautious and could in no way be easily shot on account of their quick, skilful flight. I thought at once of the remark of Kumlien, that this bird is hated and killed by the Eskimos of Cumberland Sound, because it warns the caribou of the hunters by its lively calls (1879, p. 74). The young keep themselves somewhat concealed at first. The old birds, however, sit down on a rock or stone, observe every event with attention and call incessantly upon the discovery of an unusual appearance. At the same time they move about restlessly here and there. The monosyllabic note, seldom of more syllables, in spite of its simplicity in the differing modulation, succeeds very well in giving the bird's frame of mind. Not rarely, single males fluttered up in the air singing, to a considerable height, when I trod upon their grassy breeding range [p. 391]. This song, however, may not possess the heartiness and length of the spring song. It was a frequently repeated *Wiete, wiete, wiete*, to which was connected a hasty, confused twitter. At last the bird fluttered down from the air, often within a few meters of the observer, to settle down at last for some minutes on the ground. The liveliness of the Pipit and its abundance in our district make it the most striking and characteristic representative of the world of small birds there during the breeding time.

Later in the year, migrants appeared, and at times were much more quiet and less shy. Until far into October, I observed some specimens, apparently old males especially. The latter sought their food on the open beach. They liked to come near human habitations, as did also the other small birds. Indeed, one would have been able to take more prizes if he had always remained there. How often we turned homeward from strenuous expeditions in the surrounding country without success, and here at last found game. I have taken full numbers of all species of the four small land-bird migrants while at work in a room or in the tent, hearing their call and hastening out quickly. Naturally, shooting near men and dogs makes danger not to be underestimated; but in bad weather it was certainly the most convenient.

Penthestes hudsonicus hudsonicus (Forst.). [p. 391]. *Hudsonicshe Meise.* — HUDSONIAN CHICKADEE.

Eskimo: *Atsæktâtsâjôk* (*Atsatâtâjôk*), *-jûk, -jut* (probably an imitation of the song).

Although the birds of Ungava Bay have been subspecifically separated by Samuel N. Rhoads in 1893 as *Parus hudsonicus ungava* (*Auk*, X, p. 328), this form for the present, indeed, is denied recognition.[74] Because material is not at my command, for the present I follow in the above appellation R. Ridgway (Birds of North and Middle America, III, 1904, p. 413), who compared sufficient material from Ungava Bay with birds of other districts. This species goes as far north in Labrador as there is a little bush forest. At George River, southeast Ungava Bay, according to reports of Eskimos there, it is said to occur not rarely, and Spreadborough for this same place calls it indeed "common" (Macoun, III, p. 691). In the south of our more restricted district it may also occur, at least in times of migration, as a not rare visitor.

Saxicola oenanthe leucorhoa (Gmelin). [p. 391]. *Nordischer Steinschmätzer.* — GREENLAND WHEATEAR.

[72] *Anthus rubescens* (Tunstall), Pipit, of A.O.U. Check-List, 1910.—R.M.A.

[73] Could they not be caterpillar hairs? I found and collected some thickly-haired caterpillars, but could not recognize the species.

[74] This proposed subspecies, *P. h. ungava* Rhoads, has not been recognized by the A.O.U. Check-List, 1910, and subsequent supplements.—R.M.A.

Eskimo: *Erkogolek, -lik, -lit* –from *erkok* = hind part, on account of the characteristic white lower back); at Killinek, also *Okallajok, -juk, -jut* (p. 392) (=one who talks much through another, on account of the confused twittering song).

Rather rare breeding bird and migrant in our district, but as a breeding bird apparently always more frequent than farther south on the Labrador coast, from where, at any rate, I also saw eggs; I secured five specimens from Okak for my collection. Bigelow heard of the breeding of this species at Nachvak, although he observed no bird himself (1902, p. 31). Near the Killinek mission station, Wheatears are said to come annually for breeding, and Mr. J. Lane repeatedly found their eggs. Missionary Perrett confirmed this for 1906, but the birds were disturbed in this year and disappeared then. Kumlien calls this species also a rare breeder in southeastern Baffin Island, from Frobisher Strait to Cumberland Sound, where it is quite well known to the natives (1879, p. 73).

A female with several young came into my sight, when I was about to step on land south of Takpangajok Inlet, northeastern Ungava Bay. They raised their smacking *T* in a lively fashion and were quite shy. After I had shot a young female, I did not catch sight of any other.

This specimen in my collection, most probably a bird hatched in the vicinity, has moulted strongly into the first fall plumage and has rather dark yellow-brown under parts; wings and tail are, because arising from the first juvenal plumage, hardly to be taken into further consideration. Weight in flesh: 31.8 g. Total length: 154 mm. Spread of wing: 300. Wing: 100. Tail: 60.5. Tail+wing: 17. Bill: 14. Tarsi: 29. Middle toe including the 6 mm. long claw: 20 mm.

Iris: dusky dark brown. Bill and feet: blackish-gray.

Stomach contents: Click-beetles (*Elateridæ*) and other remains of bettles (Rörig).

This bird might scarcely be as rare, as one might assume from the literature. This comes from the fact that the natives do not know the name very well. Von Schubert's informant has already listed it for the region of Okak (*Gelehrte Anzeigen*, 1844, p. 427). The bird leads, however, a shy, uneventful summer life, arrives late in the spring and seems to leave its breeding districts again as soon as the young are ready to fly, on which account it is easily overlooked.

I would at any time be very grateful for communications concerning corrections and completions of the material discussed, since in the future I also purpose to concern myself with the districts in question.

THE AUTHOR.

Dresden-Plauen.

[It is evident from the last and foregoing references in the text to arrangements which Hantzsch had made for receiving additional ornithological material from Labrador in the future, that he planned to follow up the subject. Hantzsch's later "Contributions to the Knowledge of Northeastern Labrador,"[75] while mainly geological and ethnological, contains a list of the birds (pp. 225-229), very briefly annotated, but really adding nothing to the present contribution. His subsequent extension of the field of his work to Baffin Island and untimely death on the eastern shore of Foxe Basin in the spring of 1911, prevented any further publication on the related Labrador field. Dr. Erich Hesse, in his critical study "Bernhard Hantzsch's Ornithological Results in Baffin Island,"[76] which comprises also a reprint of Hantzsch's posthumous "Ornithological Journal—Observations during a Journey in Baffin Island,"[77] includes a number of references to Labrador specimens. The ornithological side of Hantzsch's work has been quite fully published, as is shown in a bibliographical list of 29 titles relating to Hantzsch and his work, appended to an article by the writer entitled "The Work of Bernhard Hantzsch in Arctic Ornithology," *The Auk*, Vol. XLV, No. 4, October, 1928, pp. 450-466. Professor Dr. Bernhard Hoffmann, president of the Ornithological Society of Dresden,[78] of which Hantzsch was an honoured member, recently wrote to me stating that he had been going over some of Hantzsch's diaries which are preserved in Dresden. Hantzsch's last journals contained many scattered items, particularly notes on birds observed on his voyage of nearly two months from Dundee to Blacklead Island, and Dr. Hoffmann was preparing a paper on these gleanings for the Ornithological Society of Dresden, "From B. Hantzsch's Last Journals,"[79] which he hoped soon to have in print. This should prove an interesting and valuable supplement to Hantzsch's notes on pelagic birds in the early sections of the paper here presented.—R. M. ANDERSON.]

ERRATA

In Volume XLII, 1928:

Pages 2, 33, 123, 146, 172, 201, for Bernard Hantzsch, read Bernhard Hantzsch.

Page 3, footnote, last line, for Friedlander, read Friedländer, and add, pp. vi, 342, map and 26 illustrations.

Page 38, line 16, for Hoffenthal, read Hopedale.

Page 39, line 2 from bottom, for 1903-06, read 1903-04.

Page 123, under *Gavia alba*, take in footnote: *Pagophila alba* (Gunnerus) of A.O.U. Check-List, 1910.—R.M.A.

Page 124, line 4 of footnote 19, for Johathan, read Jonathan.

Page 172, line 6 from bottom, for Kjaerblling, read Kjaerbölling.

Page 172, line 14, for ovserved, read observed.

[75] "Beiträge zur Kenntnis des nordöstlichsten Labradors," *Mitteilungen des Vereins für Erdkunde zu Dresden*, Hefte 8 and 9, 1909.

[76] "Bernhard Hantzschs ornithologische Ausbeute in Baffinland," *Journal für Ornithologie*, Vol. 63, No. 2, April, 1915, pp. 137-228.

[77] "Ornithologische Tagebuch. Aufzeichnungen während einer Reise in Baffinland," *Sitzungsberichte der Gessellschaft naturforschender Freunde zu Berlin*, 1913, No. 2, pp. 141-160, figs. 1-10.

[78] Ornithologischer Verein zu Dresden.

[79] "Aus B. Hantzschs letzten Tagebuche," von B. Hoffman.

Page 175, line 12, for Hoffenthal, read Hopedale.

Page 176, line 35, for specmiens, read specimens

Page 177, line 3, for Hoffenthal, read Hopedale.

Page 203, footnote 35, for *ilsandica*, read *islandica;* footnote 36, for Linnaeps, read Linnaeus.

Page 204, line 30, for ornitholgoists, read ornithologists.

Page 205, footnote 38, for, of *Melinitta icelandi;* read, as *Melanitta deglandi.*

Page 206, line 12, for aslo, read also; 3rd line from bottom, for occasinoally, read occasionally.

Page 207, line 6, *for albifrone*, read *albifrons;* line 18, for Hutchin's, read Hutchins; line 10 (2nd column), for *candensis*, read *canadensis*; line 20 (2nd column), for Marsichal, read Marischal.

Page 225, line 6 from bottom, for *pussillus*, read *pusillus.*

Vol. XLIII, 1929:

Page 12, footnote 57, for Riky, read Riley; for *logopus*, read *lagopus;* for 1988, read 1789.

Page 13, line 17, for Eskimso, read Eskimos; footnote 58, for visitin, read visiting.

Page 14, footnote 58, line 11, for 1926, read 1925; 2nd paragraph, for supsp., read subsp.; footnote 58, 2nd line from bottom, for *grœnlandcus*, read *grœnlandicus;* footnote 58, 2nd line last paragraph, for plumage, read plumages.

Page 16, footnote 59, for Jagerzeitung, read Jägerzeitung.

Page 17, 3rd paragraph, read *Aquila chrysaxtos;* 4th paragraph, for *alascans*, read *alascanus;* footnote 61, for ox, read of.

Page 33, 2nd line from bottom, for intregrading, read intergrading.

NOTES AND OBSERVATIONS

ON THE QUESTION OF, "IS IT RIGHT TO PROTECT THE FEMALE OF THE SPECIES AT THE COST OF THE MALE?"—In an article entitled as above, Mr. Otto Schierbeck has placed before readers of the January number of this magazine an old question in a way which will carry conviction of his deductions to many. While feeling, as students of natural history in general must, grateful to Mr. Schierbeck for his careful work of gathering and presenting data on the moose of Nova Scotia, I am, nevertheless, impelled to take exception to one of his ideas which seems probably wrong from a biological standpoint and certainly wrong from a purely logical point of view.

The idea objected to is expressed by Mr. Schierbeck as follows: "If nature had intended that the bull moose should have about an average of eight mates, it would have provided accordingly. For every male calf born there would be eight female calves. The fact that about equal numbers of male and female calves are born is, to my mind, the best argument for the monogamy of the moose." And then, farther on, Mr. Schierbeck adds: "Practically the same remarks . . . apply to the deer."

On logical grounds it is possible that nature did intend the male to have an average of, say, five mates and still produce about an equal number of male and female young for reasons as follows: Assuming that, in a life span of twelve years, the male deer reaches a condition of physical perfection whereby he, before being crowded out by a more powerful adversary, is able to serve, for two consecutive years, five does and successfully to forestall all attempted matings of other bucks with his five does, he may sire, in a breeding span of ten years, the same number of offspring as if a condition of monogamy existed under which he mated each year with but one female. Furthermore, it may be seen that this condition of polygamy, not only would permit, but would *require*, the production of about equal numbers of male and female young if a stable population were maintained upon the same basis of breeding, with other conditions remaining the same.

From a biological point of view Mr. Schierbeck's idea appears probably erroneous because the hypothetical, polygamous condition, postulated above, or one simliar to it, appears *actually* to exist among deer. At any rate, the writer is convinced by personal observation that, at least in certain regions, roughly equal numbers of male and female mule deer fawns are born, and the testimony of numerous, reliable naturalists is to the effect that in these certain, as well as in many other, regions, a given number of physically superior bucks serve, in one year's breeding, several times the same number of does.

Although beside the point of this essay, the writer would here champion the current policy of protecting the female at the expense of the male in the case of deer, and in any species of American game where polygamy exists, for the obvious reason that cases of potential mating are not diminished if one-half the population of males be eliminated, whereas an elimination of one-half the female population would cause a potential decrease in mating of the same amount, namely one-half.—E. RAYMOND HALL, *Museum of Vertebrate Zoology, University of California, Berkeley, California.*

BARN SWALLOWS—During the last four summers as occasion offered I have been watching the habits of a pair of barn swallows. They arrived first some time late in June, 1924 I wondered

why they came so late in the season but one of my neighbours told me afterwards that a pair of barn swallows had come to his barn that spring and had built a nest on the track of his hay pitcher. He did not find the nest until it was finished and then he had to destroy it and the birds left the barn. The probabilities are that they were the same pair of swallows. In our barn they found a partly built and deserted nest of another pair of barn swallows that had been there a number of years before. It was on a piece of timber which was spiked to two rafters in the peak of the barn and the hooks of the hay pitcher were attached to it. They took possession of this old nest and began carrying mud and grass and soon finished it. The female laid her eggs and incubation began. The male would sit on the peak of the roof outside directly over her head and talk to her through the roof. The birds both seemed to be very nervous, easily excited, and afraid of everybody and everything.

We had an old tom-cat with a bell on him who behaved fairly well towards birds as a rule because he was afraid of consequences. The swallows led him a life. Every time they saw him in the barnyard they would swoop down on him, sometimes one after the other, until he would run for his life and get under cover. They would even dive at him if he happened to be on the front verandah steps, clear around on the other side of the house. One day a neighbour's half-grown kitten strayed into the yard and the birds tried the same tactics. The kitten crouched down for a while as if afraid for its head, but soon its feline nature got the better of its fears and it stood up on its hind feet and batted at the birds with its front paws with claws extended. Then the swallows concluded they had better leave it alone. One day a young robin got into the barn somehow and those two swallows had harried it from beam to beam until it was about exhausted when we found it. It was caught and put out in the yard on the woodpile and it sat still for nearly an hour to rest.

We were hoping that the young birds would be able to fly before we had to use the hay pitcher, but they were not. When the men first began to haul in the hay, the birds whirled round and round and dived at the head of the man on the load and when the pitcher was finally used they nearly went frantic. They soon learned, however, that the rope slipping through the pulley did not move the nest or hurt the young ones, so they got used to it. The pair started house-keeping so late that year that they only raised one brood of four birds and they disappeared about the first of September.

The next spring, what was undoubtedly the same pair of birds came back alone on the nineteenth of May. They again repaired the old nest and raised their family of four in it. This summer they were less nervous and paid no attention to a person walking across the yard or entering the barn, but they still fought the cat. One odd thing I noticed, we had a young pup around the yard about the size of the cat, and the swallows did not bother him at all. After the first brood had learned to fly, we saw the adults carrying the nesting material into the barn, but it was some time before we found out where they had built. Not until they began to carry food to the second brood were we sure.

At the other end of the barn from the first nest a board about nine or ten inches wide had been nailed in an almost horizontal position between two rafters. The outside was a little higher than the side next to the roof. On this board the second brood was reared. I can not say the nest was built on it for there was very little nest. After the birds had flown we had the curiosity to put a ladder from the hay in the mow to the peak of the barn and to climb up and examine the shelf. The birds had carried mud and built a ridge about an inch and a half high along the outer edge of the board for perhaps twelve or fifteen inches. If they had had any nesting material behind the mud ridge it was gone. The young birds had quite a nursery to hop around in. I found eight three-inch goose feathers on top of the hay in the mow which had evidently been wafted down from the nest, but they were not at all soiled. The nearest geese were about half a mile away.

The spring of 1926 was late and cold. The swallows arrived ten days late on the twenty-ninth of May. They reversed the order of occupying the nests, using the board nursery for the first brood. It was the seventeenth of July when they succeeded in getting the five baby birds lined up on the telephone wire where they could feed them conveniently. I saw the seven swallows sitting in a row shortly after dinner About an hour later a sudden thunder storm and gale of wind came up and a huge maple tree was blown down breaking the telephone wire and slinging the little birds in all directions. After the storm was over I went out to see what had become of them: one was on the veranda roof, one on the ground clinging to a broken butternut limb, one in some choke-cherry bushes and two were in the butternut with the parent birds. It was not long, however, before the old birds had them gathered up and marshalled back to the barn and the cross rope of the pitching

machine, which the adult birds seemed to think was put there for their especial benefit. They did not seem to be in any hurry to go to housekeeping again, and I wondered if they would raise another family that year—but they did.

It was not until August 23rd that I heard twittering in the old nest. The weather was cold and rainy for a week at a stretch and the birds were kept busy trying to feed a family. It was the eighth of September when the first young one left the nest, hopped down to the pulley and out on the rope. Next day two more ventured out. On the tenth all four were perched in a row, but returned to the nest at night. On the morning of the 11th it was bright and clear with the sun shining, but with a touch of frost in the air. I went out and opened the big barn doors and sat down on a stool to watch the little birds make their first venture into the outside world. I timed the old birds by my watch to see how long it took them to go out, catch a mouthful of insects and return. The two birds made 28 trips in 50 minutes or about one trip in two min. utes. I wondered where they could find insects at all, the weather had been so cold and wet. Neither bird rested at all in the half hour I sat and watched. Despite the fact that the young birds changed their positions on the rope quite frequently the old birds fed them in turn fairly well. With the doors open and the sunshine pouring in, the babies began to take short flights around inside of the barn and seemed to catch an occasional fly. By nine o'clock the strongest of the four had been outside and back several times and by dinner-time they were all flying and resting on the roofs of the house and barn. They returned to the barn nights until the 15th, and then they were able to fly well enough to start on their long journey south.

Last spring (1927) the pair came back on May 21st and again they reversed the order of occupying the two nests, using the nest for the first family and the nursery for the second, with four birds in each brood.

The question that puzzles me is what happens to all the young birds, for the parents come back alone each year. They have raised 29 young ones in the four years—all healthy and strong—but none has come back to the place where they were hatched. The first time they used the shelf nest for the first brood they had five young birds. Mr. Jack Miner speaks as if the barn swallows always had five in their first brood, but on only the one occasion did I see five. Perhaps they found the five too many to feed. Another puzzle is where the first brood goes to after they learn to fly well; they do not come back to the barn even to spend the nights. Once or twice during the remainder of the season they will come back, sail around for perhaps an hour, and then disappear again and on no occasion have I seen the two broods flying around together. It does not even seem as if the first brood waits to migrate with their parents unless there is some general rendezvous for all the swallows in the neighbourhood of which I know nothing.

One little incident that I saw was rather curious. A young bird after it had learned to fly well was carrying a small goose feather in its bill. It would fly high up in the air and drop the feather, then it would sail around in a big circle and catch the feather before it reached the ground. It repeated this performance again and again. I wondered if it were playing with the feather or if it dropped it accidentally, but it really seemed as if it were trying to play.

I have been amused at the way the birds have gained confidence year after year. They were so nervous and easily frightened the first summer and last year nothing seemed to worry them at all; they acted as if they owned the place.—MRS. SUSAN K. SQUIRES, Fredericton, N.B.

THE PILEATED WOODPECKER.—In reading what is written about the Pileated Woodpecker, one gathers the idea that it is a rather rare bird living away from men and civilization and not often seen by the ordinary bird student. I have had no opportunity of studying birds in the other provinces of Canada, and do not know so very much about some parts of my own province of New Brunswick, so I cannot say how rare or otherwise the Pileated Woodpecker is, but we have seen it quite frequently here in Fredericton. It may be that it is the same pair of birds or their progeny that we have seen year after year, often without going away from our own land and sometimes without leaving the house.

For those who do not know, I might say that Fredericton is built on a semi-circular intervale about three-quarters of a mile broad and one and a half or two miles long, raised not many feet above the high water level of the Saint John river. Geologists tell us that in ages past, before the river broke through the limestone rocks at the Reversible Falls at Saint John, that this intervale was all under water and that the river lapped the foot of the hill which lies stretched along behind the city. We live half way up this hill, but not more than a ten minutes' walk from four factories and two railway freight yards where trains are shunting all the time. Se we are not exactly in the wilds.

For the last twelve years I have kept a rather desultory record of the arrival of the birds in the spring, from the first of March until the advent of the Wood Peewee about the first of June, but have not bothered much taking notes the rest of the year.

In looking back through my record I find my first mention of the Pileated Woodpecker is on May 30th, 1916, then it is not mentioned again till April 28th, 1922. In 1923 two Pileated Woodpeckers were noted on March 18th, and they returned three or four successive days, making the round of the same trees each day and I saw them again on April 2nd. In 1924 they are recorded on April 22. In the spring of 1925 the book just says "Pileated Woodpeckers stayed all winter," and in 1926 that two birds, male and female, were around all winter. In 1927 I did not see them until March 18, but it was probably because I was too preoccupied with sickness in the home to watch for birds, but I have no doubt that they were here for one was seen on December 31st. Beside these records of winter and spring I have distinct recollections of three summer visits. One bird was perched in a butternut tree where I could see it from a window preening its feathers on a rainy Sunday morning. At another time I saw one climbing an elm tree in front of the house and a third time one was clinging to the top of a cedar fence post picking something on the top. Another member of the family has also three summer records. Once a bird was flying across the orchard and at two different times and places a bird was seen eating the insipid white berries of the red osier which they seem to like.

I used to see the square funnel-shaped feeding holes of these birds long before I knew just what species of woodpecker made them. I have found half rotted fir trees literally torn to pieces by them in their search for grubs and ants. The size of some of the chips they tear out is surprising, especially when they are from a live tree. We have many very old trees and this is, I suppose, one reason why the birds visit us.

In the winter and spring of 1926, two birds, a male and a female, were seen at different times investigating the trees on the grounds of the University of New Brunswick and around several homes which have large old trees about them. A bird that was probably one of the same pair, attacked a hemlock that is about a hundred yards from our house and beside the road where people and teams were passing all the time. The bird dug seven large holes in the tree—four on the side facing the road and three behind. The largest hole was nine inches long and eight deep, the funnel-like point reaching tunnels the ants had made up through the heart of the tree. The bird seemed to feed any time in the day. A woman who passed at seven in the morning on her way to a factory said that the bird would watch her coming and dodge to the back of the tree and then peek around to see her go by. A high school boy told of seeing the bird on his way to school at nine and a milkman on his return home at eleven stopped his horse and sat and watched the bird making the chips fly. When the birds returned in 1927 they made two more big holes in this same hemlock. It looked sound but the bird's excavations showed that the centre had been riddled by the ants.

There is supposed to be some slight migration among the Pileated Woodpeckers, so it is a question whether the birds we see in summer and those we see in winter are the same individuals. It seems to me, however, that the birds must breed somewhere near. The University of New Brunswick has over 3,500 acres of wild land not far behind the city. It was granted to the College of New Brunswick in 1800 by a Provincial Charter. Part of this land has lain untouched through the years for it is long, rocky ridges covered with mixed growth, almost surrounded by sphagnum bogs and only disturbed by an occasional moose or deer. Some part of this land should provide the seclusion these woodpeckers desire for breeding.

I do not know how plentiful these birds are in the province as a whole, but I do know that they are no uncommon sight, dead, in collections. I have seen them used as mantle ornaments, stuck up on verandahs, in schools and among the exhibits of the amateur taxidermists, as well as in the more valuable collections of mounted birds. I counted eight in one such collection the other day.

It rather seems as if the birds have more confidence in man, as each successive year passes. Probably the Migratory Bird Convention Act deserves the credit for this change, for they really seem to fly around as unconcerned as crows.—MRS. SUSAN K. SQUIRES, Fredericton, N.B.

THE RED-HEADED WOODPECKER IN OTTAWA.—In view of the scarcity of this bird in the Ottawa vicinity, it is thought that the following notes may be of interest.

On June 25th, 1926, a Red-headed Woodpecker was noticed in Ashbury College grounds.

On June 28th, 1927, a single woodpecker made a reconnaissance of the northern portion of Lindenlea, visiting nearly every tree in the vicinity. He appeared to be extremely nervous and seldom stayed long in one spot. He alighted on our feeding tree and sampled the suet, and was seen

on and off for the next few days. Then two woodpeckers appeared, both feeding at the same time. This aroused our curiosity, as we thought that one would surely stay at the nest while the other fed. Closer observation revealed the fact that one of the birds was evidently one of the 1926 brood, as his head was scarlet but the throat was greyish black, the plumage as a whole being speckled with white or grey spots. One day, however, we were lucky enough to see all three together, and in August the old birds introduced two juveniles to the suet bag.

The feeding of these five Red-heads, with four Hairy Woodpeckers and six Downies, together with at least one pair of White-breasted Nuthatches, necessitated the installation of a second suet bag on another tree, and from then on until September 4th, the garden could almost be described as a Babel, with the Red-heads easily the masters of the other birds. On this date the adults and the birds of the year left the vicinity, but the 1926 bird was seen until September 11th when he too left for warmer regions.

We are looking forward to seeing the family again and hope to have more definite data as to nesting dates and first appearance of the young next year.—ALICE AND WILLIAM H. LANCELEY.

BLACK TERN AT LONDON, ONTARIO.—There are often interesting occasions when history "repeats itself" in the bird world. One from London, Ontario, during the past spring concerns the Black Tern, a very rare visitor with us.

During May, 1926, while investigating a small but rather quiet, marshy place along the river near the sewage disposal plant, we found that the discharge from the plant evidently provided conditions which made the spot an attractive one for waders. We visited it frequently during the latter part of the month and listed most of the commoner varities, though in very limited numbers, of course. On May 28th just as we arrived we caught a glimpse of a bird that looked like a Black Tern but it disappeared behind some willows before we could positively identify it. We approached cautiously and found not only one tern but two of them sitting on a large rock in the middle of the stream. They remained some time permitting us to examine them closely and then flew up and down the river calling as they went.

Having once seen the tern on that particular rock, every time we went to the spot we looked there again, just why I do not know any more than I know why in passing a chimney that the swifts frequent, one will, even in the dead of winter, unconsciously glance up as if expecting to see a cloud of them circling in the air.

On May 12th, 1927, we were again at the river but found the heavy rains had so swollen the stream that the edges were unsuitable for waders, although one spotted sandpiper was climbing around the lower branches of a partly sumberged willow. The tern rock was still above water, however, and of course we trained our glasses on it from force of habit. Very much to our surprise we found that *Chlidonias nigra surinamensis* was again sitting calmly thereon.

The marsh area is very small and well within the city limits so that it seems unlikely the birds would live there, but in 1928 we intend to keep an eye on the place and see if we can again record this rare visitor and perhaps find out something more concerning it.—E. M. S. DALE.

THE DOWITCHER AT LONDON, ONTARIO.—There are always interesting things cropping up in the experience of bird students, some times a new "spot", sometimes a new species. Both of these occurred during the spring migration (1927) at London, Ontario.

On May 18th two of the lady members of our Bird Club had occasion to drive to Lambeth, some seven miles south and west of the city, and after starting home by the highway, decided to turn round and take the back road. About a mile north of the village they took the turn east and were hardly round the corner when they discovered a flock of waders at a pool in a farmer's yard, scarcely a stone's throw from the house. Copious rains had filled a natural hollow and drainage from the barn yard evidently provided a bountiful supply of food. Realizing that it was a "find" they went to the farm house and telephoned the city. After work at five a number of the men of the club drove out and found 3 Least Sandpipers, 2 Semi-palmated Sandpipers, 3 Baird's Sandpipers (first spring record), 3 Semi-palmated Plover, 3 Spotted Sandpipers, 2 Lesser Yellowlegs, 1 Killdeer and last, but not least, 26 Dowitchers in full spring plumage, their rosy breasts glowing warmly in the brilliant sunshine. They appeared quite unconcerned and allowed us to approach very closely. Some bathed or preened their feathers, others fed diligently, whilst the whole company kept up a chatter of conversation amongst themselves that was delightful to hear. This was a new bird for many of the party, a new record for the county, and was pronounced by Mr. Saunders as the most thrilling wader spectacle that he had ever seen.

The pool remained interesting for some time, on May 22nd having 30 Semi-palmated Sandpipers, 20 Semi-palmated Plover and 2 Red-backed Sandpipers, the latter being the first spring record

of the species, besides smaller numbers of other varieties. These numbers may seem ridiculously small to those who are favoured with good wader ground, but in Middlesex County there are no such places and we consider ourselves fortunate indeed if we find an odd one of some of the commoner species during the spring season—Killdeer and Spotted Sandpipers, of course, excepted—E. M. S. DALE.

THE EUROPEAN HARE, A NEW MAMMAL FOR TORONTO.—Professor J. R. Dymond, in delineating the present range of this introduced hare in Ontario,* gives Uxbridge and Markham as localities which mark the limits of the animal's easternmost penetrations in the province. The range as given by Dymond includes the Toronto region, but there have been no specific records published of the presence of this hare in the district about Toronto.

The following records, from the files of the Museum, are all from localities within ten miles of the city limits and constitute our present knowledge of the animal in the neighbourhood of the city. For the first record we are indebted to Mr. J. A. Varley, who reported shooting two near Erindale during the winter of 1924-25. Mr. Varley has had considerable experience hunting this animal in other parts of Ontario. At Woodbridge the hare appeared in 1925 (the first record for York county), according to Mr. R. J. Rogers of Newmarket, agricultural representative for the county. In October of the same year Mr. Varley shot one at Maple and in the following winter (1925-26) two were taken just north of the city, on the farm of Mr. Coppard off Bathurst street, according to information supplied to Mr. L. L. Snyder. In January, 1926, the daily papers reported a "jack rabbit" having been shot at Rouge river, east of the city.

During 1927 we were informed by Mr. Alan Secord that he had seen a few at Thistledown and also at Port Credit. Last year (1928) Mr. R. V. Lindsay observed one on the fields at Islington on June 3 and found a dead specimen near Mimico on September 2. The last report we have, and the first within the city limits, is of one seen by Mr. R. J. Rutter at Sunnyside beach on December 24, 1928.

It might be mentioned that no attempt has been made to ascertain the abundance of this hare beyond this ten-mile limit and all the records mentioned, with the excpetion of Port Credit and Erindale (Peel county), are in the county of York. —JAS. L. BAILLIE, JR., *Royal Ontario Museum of Zoology*, Toronto.

*Can. Field-Nat., XLII, Apr. 1928, p. 95.

In Memoriam
COL. W. P. ANDERSON

With the celebration of the 50th anniversary of the founding of the Ottawa Field-Naturalists' Club, our thoughts naturally turn to its early days and the many who took an active part in its formation. In looking over the list of foundation members there are the names of many who remain with us and retain their interest in the Club, but during recent years we have lost several who were most active in the early days.

With the death of Lieut.-Colonel W. P. Anderson, C.M.G., F.R.G.S., M.I.C.E., at Ottawa, on February 1st, 1927, at the age of 75 years, the Club lost one of its founders and a very prominent member in its early days.

As one of the group of enthusiastic amateur naturalists which founded the Club, he was for many years an active member of the council, a Vice-President, and a constant attendant at all its excursions. His interests were with the Geological group, of which he was one of the leaders. In the early numbers of the Transactions are his papers on the Asbestos, Graphite and Phosphate deposits of this district. He was also a member of the Ottawa Library and Scientific Society and President in 1885.

Col. Anderson was born at Point Levis, P.Q. and educated at a private school in Quebec, Bishop College, Lennoxville and St. John's College, Winnipeg. He was appointed to the engineering staff of the Department of Marine and Fisheries at Ottawa in 1874 and rose to the post tion of chief engineer of the department, retiring in 1919 with superannuation.

He had a very keen sense of duty and offered his services in many ways to the public welfare. While still in his 'teens, he volunteered and served in the two Fenian invasions. On coming to Ottawa he joined the Governor General's Foot Guards and later with the establishment of the 43rd Battalion, he joined as adjutant and later attained the colonelcy, which he retained for ten years. As a rifle shot he captured the Governor General's Medal, was twice a member of the Bisley Team and later commandant. He also established the Canadian Militia Gazette which he edited for some years. He was a charter member of the Canadian Society of Civil Engineers and President in 1904. He was a Fellow of the Royal Geographical Board and a member and chairman of the Geographic Board of Canada.—DR. H. B. SMALL.

A JOURNEY INTO THE PAST[1]

A Review by E. M. Kindle.

IF GEOLOGISTS followed the example of Copernicus, who postponed publishing his theory of the solar system for thirty-six years, or of Darwin whose observations on earthworms were continued for 30 years before he published his conclusions, this review would not have been written. It would be unncessary because the results of the researches recently published by Professor Cummings and Mr. Shrock under the above title would probably have been announced by some of their predecessors who have worked on the same problems but with less time at their command. One of these predecessors, the reviewer happens to know, was required when he undertook a piece of research in the area which has been so ably treated by Cummings and Shrock, to state the exact day of the month on which it would be ready to print. Geological work undertaken on a basis which requires the geologist to keep only one eye on the rocks and the other on the calendar, has unfortunately not been confined to Indiana. The present work affords good internal evidence that Indiana has definitely abandoned this system of getting its research work done.

The bibliography cites the work of 85 authors who have dealt with the problems treated in this volume or whose works have been consulted in its preparation. The first recorded geological observations on the area were made ninety years ago, by the distinguished geologist David Dale Owen, who came to Indiana with the famous "Boatload of Knowledge."

Seven years ago the senior author of this volume set out thoroughly to explore the bottom deposits of a sea which several million years ago stretched across northern Indiana and adjacent states. Dredging the bottom of a sea which vanished more than 100,000,000 years ago may sound like an impossible fairy story, but this is not the story of a young Prince who was ordered to do an impossible thing to obtain the hand of a fairy Princess. Professor Cummings and Mr. Shrock have returned from this quest with very definite and valuable results. Inspection of their palæogeographic map will enable the curious reader to see just where the hot, treeless shorelines of this immensely ancient sea lay, which has yielded much booty to these travellers into the very distant Past. Professor Cummings has had the wisdom however to introduce his map with this significant caution, which the reviewer wishes to commend to every user and maker of palæogeographic maps: "Palæogeographic maps are useful but dangerous. They are useful in visualizing an intrepretation, but dangerous if taken too seriously." That these authors have had the time, patience and industry pretty thoroughly to comb the remnants of the old Silurian sea bottom exposed in northern Indiana is shown by the considerable graptolite fauna to which this work introduces the reader. These curious fossils, often with a hack-saw profile and sometimes called "sea pens", had been overlooked by previous students of the central and Northern Indiana rocks. These authors have contributed very materially towards extending and perfecting knowledge concerning the structure and in revising the stratigraphy of the northern half of the State. The physiography and economic geology are also included in the scope of the volume.

Owing to the great mantle of Drift, sometimes 500′ thick, left by the retreat of the Continental ice sheet, geologists have had relatively few exposures of the old rocks in Northern Indiana to guide their conclusions concerning their structure. These conditions originally lead geologists working in the Indiana field to infer for all of northern Indiana a simplicity of structure comparable with that which characterizes much of southern Indiana. It was long believed that the rocks of Indiana were without faults. Professor E. T. Cox reported in 1879 that "Not a single true fault . . . has yet been discovered." Though the work of G. H. Ashley and others shattered that belief as regards southern Indiana in the nineties the dogma of simplicity of structure still held sway for the drift mantled north till a recent date. Cummings and Shrock, however, interpret the geology of the Wabash valley in a way which indicates that the rocks of that region have not enjoyed the undisturbed repose since Middle Palæozoic times which has generally been credited to them. The Kentland "structural puzzle" these authors do not attempt to unravel but refer the rocks to the Ordovician where they belong. Since the bibliographic list of Cummings & Shrock appears to suggest that the first fossils pointing toward the Orodivican age of the Kentland beds were figures by G. K. Green in 1906 it may be noted here that Kindle and Breger[2],

[1]THE GEOLOGY OF THE SILURIAN ROCKS OF NORTHERN INDIANA by Edgar R. Cummings & Robert Shrock; The Department of Conservation, State of Indiana; pp. 226, figs. (including many small maps) 57; 2 maps and 1 chart.

[2]28th Ann. Rept. Ind. Dept. Geol. & Nat. Resources, 1903 (1904) p. 447 Pl. X fig. 1.

in 1904, two years before G. K. Green's paper with figures was published, figured from the Kentland beds a pelecypod under the name of *Tellinomya* cf. *nasuta*, a Trenton fossil and called attention to the close resemblance of their specimen to *T. nasuta* from the Wisconsin Ordovician; but they failed to follow the finger board thus set up and left the beds in the Silurian system. Fossils considered by Green as Ordovician in age but not figured, were reported from this unique area by John Collett [3] as early as 1883 but geologists were generally skeptical of the determinations and treated this earliest discovery of Ordovician fossils in the Kentland quarries much as botanists did the first reports of the compass plant from the same general region whose north-south pointing leaves the early explorers and settlers found useful in the trackless prairies.

If Cummings and Shrock are correct, Hoosiers do not need to go to Australia to see a great barrier reef. The Silurian rocks of the Wabash valley include coral reef structures belonging to a great barrier reef extending from New York to Illinois and Wisconsin according to these geologists.[4] In place of the glass bottomed boat or the diving helmet used by explorers of the tropical reefs only a hammer and some facility in using the imagination will be required by visitors to the old reefs or "Klintar" as these authors have named their physiographic expressions, using a Scandinavian term meaning reef hills. Still another term "bioherm" has been proposed by Cummings & Shrock for these structures (Bull. Geol. Soc. Amer. vol. 39, p. 599, 1928). This term in its derivation carries no implication other than an organic origin. Imagination is needed not only to restore the old Silurian sea which produced these klintar, but also to restore the corals whose fossil remains are inferred to have built up much or most of the reefs, for well preserved corals are by no means abundant in the Klintar. The reviewer argued once that these curious structures—because of the scarcity of corals in them, could not be reefs. But that was twenty-five years ago and he has since learned by observation that in some Palæozoic seas coral heads often lost a considerable portion of their bulk by solution even during the lifetime of a single coral colony through the etching or solution of the sea water in which they grew.

The fauna of each of the six Silurian formations recognized in this work is listed separately and all of these faunas are brought together in a table showing the observed range of the several species within the northern Indiana field as well as their occurrence in certain other Niagaran formations. This lucid presentation of the stratigraphic range of each fossil recorded makes this a work of high value to stratigraphic palæontology. The majority of these formations have been defined and named by these authors.

The fossils of one of these formations are limited almost entirely to Eurypterids, one of the least understood groups of Silurian fossils. The formation holding these bizarre creatures has been named the Kokomo limestone, after the Indiana city which claims to have produced America's first automobile. These curious fossils with their segmented bodies, wing like paddles, and dagger shaped tails resemble their nearest relatives among modern crustaceans even less than Kokomo's first automobile resembled its successors of today. The giant among these (*Eusarcus newlini*) reached a length of two feet. Whoever will secure data for an adequate account of the life and times of the Kokoma eurypterides, whence they came, whither they went and why, after flashing into the Silurian picture unattended by other forms of life and without apparent progenitors or descendants, will have the material for a story beside which the tales of the Second Lunatic in the "Thousand and One Nights" would pale.

[3] 12th Ann. Rept. I. Geol. Surv. p. 58.

[4] See also "Niagaran reefs of Indiana and adjacent states" by E. R. Cummings and R. R. Shrock. Bull. Geol. Soc. Am. vol. 39, pp. 579-620, 1928.

Bird banders might find it convenient to purchase two copies of *The Naturalist*, so that they could clip the returns relating to any special problem which they were investigating and paste these on cards for convenience in consulting such records.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS

Published by authority of the National Parks of Canada Branch, Department of the Interior, Canada

In the following returns upon banded birds it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Birds Act of Canada and the United States. The great ma ority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil, or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

RETURNS UPON BIRDS BANDED IN 1927.

MALLARD, No. 405,721, banded by John Broeker, at Portage des Sioux, Missouri, on February 26, 1927, was captured while it was nesting at Davidson, Saskatchewan, on May 1, 1927. The band was removed and the bird released.

MALLARD, No. 228,862, banded by A. R. Golay, at Kearney, Nebraska, on March 7, 1927, was killed on a farm at Shaunavon, Saskatchewan —reported on October 1, 1927.

MALLARD, No. 405,010, banded by T. E. Musselman, at Lima Lake, Illinois, on March 16, 1927, was shot at a place 12 miles south of Benito, Manitoba, on October 1, 1927.

MALLARD, No. 405,023, ad. m., banded by T. E. Musselman, at Lima Lake, Illinois, on March 16, 1927, was shot on Netley Marsh, at the mouth of the Red River, Manitoba, on September 15, 1927.

MALLARD, No. 300,869, banded by T. E. Musselman, at Lima Lake, Illinois, on March 17, 1927, was shot on Section 9, Township 21, Range 4, west of the second meridian, near the Kaposvar River, Saskatchewan, on October 15, 1927.

MALLARD, No. 405,449, m., banded by T. E. Musselman, at a place near Meyer, Illinois, on Lima Lake, on March 22, 1927, was found in a muskrat trap with both of its legs broken, by a resident of Lundar, Manitoba—reported on April 20, 1928. The bird was killed.

MALLARD, No. 420,932, banded by F. W. Robl, at Ellinwood, Kansas, on March 22, 1927, was recovered in the district surrounding the village of Raymore, Saskatchewan—reported on September 1, 1927. The band was removed from the bird.

MALLARD, No. 420,531, m., banded by Bert Lloyd, at Davidson, Saskatchewan, on April 17, 1927, was killed on the Arkansas River, south of Sallisaw, Sequoyah County, Oklahoma, on December 26, 1927.

BLACK DUCK, No. 496,113, banded by Alvah G. Allen, at Oakdale, Long Island, New York, on March 2, 1927, was shot on September 1, 1927—reported by a resident of Nicolet, Nicolet County, Quebec.

BLACK DUCK, No. 496,126, banded by Alvah G. Allen, at Oakdale, Long Island, New York, on March 3, 1927, was caught in a stub trap by a resident of Rollingdam Station, Charlotte County, New Brunswick, on May 3, 1927.

BLACK DUCK, No. 496,128, ad. f., banded by Alvah G. Allen, at Oakdale, Long Island, New York, on March 3, 1927, was caught in a trap on the Red River, Quebec, on April 27, 1927.

BLACK DUCK, No. 497,620, banded by Alvah G. Allen, at Oakdale, Long Island, New York, on March 29, 1927, was shot on the preserves of the St. Ann's Island Shooting and Fishing Club, on Lake St. Clair. Ontario, on November 2, 1927.

EUROPEAN WIDGEON, No. 386,421, banded by E. W. Ehmann, at Lake Merritt, Oakland California, on February 1, 1927, was shot on a slough on the northwest quarter of Section 36, Township 1, Range 12, west of the third meridian, Saskatchewan, near the international boundary—reported on October 11, 1927.

BALDPATE, No. 333,167, m., banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on February 1, 1927, was killed at a place near Howard Lake, on the Lesser Slave Forest, Alberta, on May 2, 1927.

PINTAIL, No. 201,737, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on February 1, 1927, was found after it had struck telephone wires, at a place ten miles west of Carmangay, Alberta, on April 29, 1927. The bird was reported as a male.

PINTAIL, (?) No. 226,841, banded by Bert Lloyd, at Davidson, Saskatchewan, about April 18, 1927, was killed at a place nine miles south of El Campo, Texas, on January 24, 1928.

LESSER SCAUP DUCK, No. 455,709, banded by F. P. Zaleskie, at Echo Lake, Lake County, Illinois, on April 19, 1927, was shot at Burntwood Lake, west of Reindeer Lake, about 104.57, Saskatchewan, on June 2, 1927.

SCREECH OWL, ad., No. 209,754, banded by Claude E. Johnson, at Ottawa, Ontario, on March 1, 1927, was shot and wounded in the wing in the same locality, about February 15, 1928. The bird was cared for and was recovering but was killed by a horse shortly afterwards.

OWL. 'No. 8 Return J. Sokoloskie, Middlechurch P.O., Manitoba, Canada, March 29, 1927," shot by Mr. J. Sokolosky, on February 24, 1927, cared for until it was again ready to fly and banded and released on March 29, 1927, was killed at Ship River, about 40 miles east of York Factory, Manitoba, during the month of May, 1927.

DOWNY WOODPECKER, No. 194,095, ad. f., banded by Austin L. Rand, at Wolfville, Nova Scotia, on April 10, 1927, was found dead under telephone wires a short distance from the place where it was banded, on December 10, 1927.

BLUE JAY, No. 438,931, banded by M. S. Crosby, at Rhinebeck, New York, on February 20, 1927, was caught in a trap at a place about seven miles from Saint John, at Bayswater, New Brunswick, during the month of November, 1927.

BLUE JAY, No. 219,958, ad., banded by H. D. Whellams, on Lot 54, North Kildonan, Winnipeg, Manitoba, on January 29, 1927, was caught in a muskrat trap in the Waterhen Indian Reserve, Township 34, Range 16, west of the Principal Meridian, Manitoba, on March 22, 1928.

CROW, No. 456,501, banded by W. E. Saunders and Jack Miner, at Kinsgville, Ontario, on January 20, 1927, was shot on a farm four miles from the city of Guelph, Ontario, on March 21, 1928. This bird was also banded with one of Mr. Miner's bands.

CROW, No. 456,508, banded by W. E. Saunders and Jack Miner, at Kingsville, Ontario, on January 20, 1927, was killed in a cornfield at Markdale, Ontario—reported on July 14, 1927. This bird was also banded with one of Mr. Jack Miner's bands.

CROW, No. 456,515, banded by W. E. Saunders and Jack Miner, at Kingsville, Ontario, on January 20, 1927, was killed at Gatineau Point, Quebec, on May 27, 1927 This bird was also banded with one of Mr. Jack Miner's bands.

BREWER'S BLACKBIRD, No. 341,137, ad. f., banded by P. S. Walker, at Point Grey, British Columbia, on February 19, 1927, was killed by a cat in Vancouver, British Columbia, on July 1, 1927.

BREWER'S BLACKBIRD, No. 341,139, ad. m., banded by P. S. Walker, at Point Grey, British Columbia, on March 26, 1927, was killed by a cat in Vancouver, British Columbia, on May 27, 1927.

COMMON REDPOLL, No. A73,018, banded by J. Robert Morton, at North Kildonan, Manitoba, on January 8, 1927, was re-caught at the same station on February 2, 1927, and February 10, 1927, and was killed by a cat when it flew into a kitchen at Old Kildonan, Manitoba, one mile from the place where it was banded, on February 14, 1927. The bird's left leg was found broken when it was first captured and it showed no sign of healing when it was recaptured.

COMMON REDPOLL, No. A73,025, banded by J. Robert Morton, at North Kildonan, Manitoba, on February 8, 1927, was recaptured at the same station on February 18, 1927, and was killed by a Screech Owl at the same station on March 3, 1927.

COMMON REDPOLL, No. A73,027, banded by J. Robert Morton, at North Kildonan, Manitoba, on February 20, 1927, was found dead at the same station on February 28, 1927.

GAMBEL'S SPARROW, No. A93,152, ad., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on May 9, 1927, was recaptured several times at the same station on May 9 and 10, 1927, and was killed by a stray shot intended for a hawk, at the same station on May 10, 1927.

SHUFELDT'S JUNCO, No. A73,381, ad. m., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on April 10, 1927, was recaptured three times at the same station on April 11, 1927, was badly battered in a trap when it was attacked by a Shrike, and died shortly after.

SHUFELDT'S JUNCO, No. A81,149, ad. m., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on April 14, 1927, was recaptured at the same station on April 15 and 16, 1927, and was found dead in a field in the same locality on April 30, 1927.

JUNCO "POSSIBLY SHUFELDT'S", No. A90,797, ad. m., banded by Joseph Wendle, at Bowron Lake, Barkerville, British Columbia, on April 19, 1927, was found dead after a blizzard and zero weather in the same locality on April 23, 1927.

SHUFELDT'S JUNCO, No. A61,618, ad. m., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on April 28, 1927, was recaptured at the same station on April 28, 1927, and April 30, 1927, and was found dead at the same station on June 7, 1927.

SHUFELDT'S JUNCO, No. 495,755, ad. m., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on April 29, 1927, was recaptured several times at the same station until May 12, 1927, when it was "killed by a Sparrow Hawk" in a trap at the same station.

SHUFELDT'S JUNCO, No. A61,684, ad. f., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on April 29, 1927, was swarming with lice, recaptured twice at the same station on May 1, 1927, and found dead at the same station on this date.

RUSTY SONG SPARROW, No. 132,148, ad., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on April 24, 1927, was killed in a mouse trap at the same station on the day on which it was banded.

ROBIN, No. 269,920, ad. m., banded by Ralph E. DeLury, at Ottawa, Ontario, on April 18, 1927, was recaptured at the same station on April 23 and 28, 1927, and was presumably killed by a cat at the same station on May 15, 1927. Only the feathers were left and as this bird was seen no more it is thought that No. 269,920, was the bird which the cat caught.

VARIED THRUSH, No. 459,086, ad. m., banded by T. T. and E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on April 19, 1927, was recaptured at the same station on April 20, 1927, and was found dead at the same station on May 12, 1927.

RETURNS UPON BIRDS BANDED IN 1926

GREAT BLACK-BACKED GULL, No. 421,-816, im., banded by Basil Colbran, at Gull Island, Lake George, Yarmouth County, Nova Scotia, on July 28, 1926, was found dead on the shore at South Eastern Passage, Nova Scotia, about June 25, 1928.

LESSER SCAUP DUCK, No. 464,316, banded by H. S. Osler, at Lake Scugog, Ontario, on October 23, 1926, was shot at the Balsam Bay, on Beaver Lake, by a resident of Sturgeon Landing, Saskatchewan, on July 27, 1928.

BRONZED GRACKLE, No. 213,737, ad. f., banded by Howard F. Cant, at 35 Lansdowne Road North, Galt, Ontario, on July 25, 1926, was shot in a cherry orchard, on Hillside Farm, R.R. No. 3, Galt, Ontario, on July 18 (?), 1928 (?).

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CONTENTS

	PAGE
Frontispiece—Lt.-Col. Wm. White, C.M.G.	69
Glimpses of Little-known Western Lakes and Their Bird Life. By J. A. Munro	70
Bird Notes from the Canadian Labrador, 1928. By P. A. Taverner	74
The Great Horned Owl in Manitoba. By Ralph D. Bird	79
Annual Report of the McIlwraith Ornithological Club	83
Notes and Observations:—	
Barn Owl in Manitoba. By B. W. Cartwright	83
Spread of the European Starling. By William J. Garnett	84
Song of the Robin. By R. J. Rutter	84
Towhee in Fredericton, N.B. By Mrs. Susan K. Squires	84
Bartramian Sandpiper Nesting Near Toronto. By C. E. Hope	85
Blue-gray Gnatcatcher at Toronto. By Stuart L. Thompson	85
Starlings at Miner Bird Sanctuary. By Manly F. Miner	85
Spring Excursions	86
Official Canadian Bird-Banding Returns	86

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The Canadian Field-Naturalist

VOL. XLIII OTTAWA, CANADA, APRIL, 1929 No. 4

THE photograph of LIEUTENANT-COLONEL WILLIAM WHITE, C.M.G., which is reproduced as a memento in connection with our fiftieth anniversary, was taken in 1870. It shows our first President at about the time when the natural history interest in Ottawa, which resulted in the founding of "The Ottawa Field-Naturalists' Club" on March 19, 1879 was developing. Colonel White, in addition to being one of the founders of our Club was a founder of the Ottawa Horticultural Society, and an early member, if not a founder, of the Ottawa Literary and Scientific Society. Like so many Englishmen of culture he had a wide knowledge of nature in its many phases, and followed more particularly horticulture, ornithology, and botany. His youngest son, although not exactly a youth, is now President of the Club.

GLIMPSES OF LITTLE-KNOWN WESTERN LAKES AND THEIR BIRD LIFE

By J. A. MUNRO

WHETHER it be on the prairie, in the mountains, or in the coast timber, the trail of the bird-man leads, as a matter of course, to a lake or failing that to a river or marsh. In scanning a map his eyes focus on each patch of blue in turn, and, if it be a map of the Prairie Provinces, his first thought concerns the nature of the lake; is it dry, existing only in the memory of the oldest local inhabitant? (There are many such on the prairie, still beautifully blue on the map.) Is it saline, barren of aquatic vegetation, or alkaline, or fresh? And what of the shore-line? Marshy, boggy, open, or brush covered? All these are vital questions to the bird-man. This being so, possibly these sketches, indicating what is to be expected at various lakes in the Western Provinces, may be of service in planning an itinerary, for little information of this nature is available through the usual channels.

MANY ISLAND LAKE, ALBERTA

It is a long drive from Okanagan Landing, British Columbia, to Many Island Lake on the Saskatchewan-Alberta boundary, the first objective in July, 1922—and anticipation held the fascination of the unknown.

On July 3rd our trail led south from Penticton along the White Lake Road to Fairview and south to Osooyos Lake. The valley was thick with the smoke of forest fires. The thermometer registered 103° in the shade at 3 p.m., and in this open country of grey sage brush the heat was intense. From the parched stony soil rose shimmering heat-waves that played strange tricks with our vision. Crowds of grasshoppers, disturbed by the passing car, clattered against the fenders or came to grief on the radiator in their aimless flight. At this time of day no birds pursued them. Indeed the country seemed birdless; a solitary Brewer's Blackbird was sighted and occasionally a silent Lewis' Woodpecker flushed from a roadside tree and flew ahead of the car for a short distance.

Ahead of us lay a fourteen-mile stretch of sand road over Anarchist Mountain, and, as the Ford boilingly protested against hill-climbing in the heat of the day, we made camp early in a pleasant grove of poplars on the shore of Osooyos Lake where the cool, still waters proffered relief from dust and heat. A Lewis' Woodpecker and a Long-tailed Chat were the only avian occupants of the grove to give notice of their presence; the former circled out over the water several times in pursuit of passing insects; the Chat whistled loudly twice, then all was still. In the evening a female Merganser swam past and, far out on the lake, a Loon laughed. The sun, copper red and misty, dropped through the smoke haze all too slowly.

In the quiet night the Chat whistled persistently—at first a welcome song to cheer, then familiarly monotonous, and finally an annoyance that banished sleep.

The following day we were on our way by five a.m. and in two hours covered the first twelve steep miles, practically all in low gear. One stop was made at the only watering place, a cold spring foaming over a cliff by the roadside. Far below us spread out the quiet waters of Osooyos and the wide river bottom, thick with dome-shaped willows. From this height the dense riparian growth looked like a carpet of moss rather than the jungle of deciduous trees we knew it to be. The rising sun, kind in its first glimmering paleness, warmed our chilled fingers and before it had gained uncomfortable strength we had reached the shadow of the grand yellow pine below the summit. Here we flushed a covey of ten half-grown Richardson's Grouse. The trail still was deep in sand, and, although the grades were slight, it was a relief to strike a hard road which, through a long winding draw banked with birch and alder, led us eventually into the delightful coolness of larch and lodge-pole pine on the summit. In a little over two hours we had travelled from an Upper Sonoran sage-brush desert, the home of Sage Thrasher and Brewer's Sparrow, to a typical forest of the Canadian Zone where the first birds met were Rocky Mountain Jays and Williamson's Sapsuckers.

The drive through the mountains to Crow's Nest was, from the bird-man's viewpoint, uneventful. It is recorded in my diary that the last Columbian Ground Squirrel *Citellus columbianus* was seen at Crow's Nest and the first prairie ground squirrel *Citellus richardsoni*, near Coleman, Alberta, some twelve miles farther east. An enormous number of these little animals are killed by motor cars—on the first forty miles of prairie road we passed over two hundred carcasses—and one wonders whether this artificial check will take the place now filled by the Swainson's Hawk when, as seems probable, this useful Buteo has been extirpated. The ground squirrels do not associate danger with the swiftly approach-

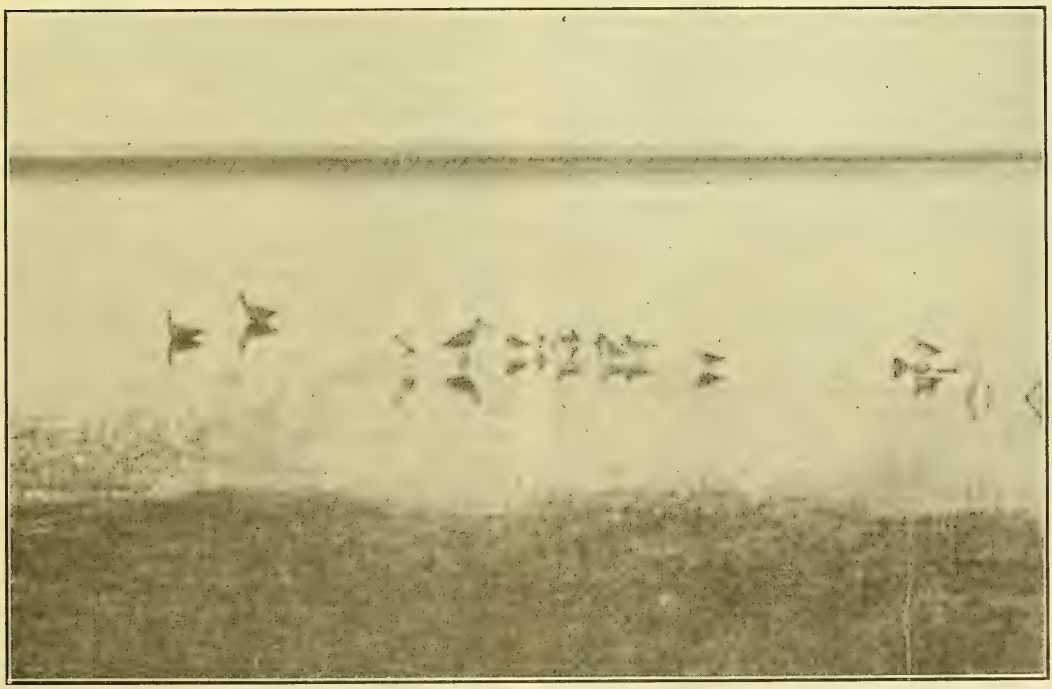
ing car and usually make no attempt to escape until too late. Sometimes an inquisitive animal will sit bolt upright in the centre of the trail and so escape; but more often the impulse to scamper away overtakes them at the precise moment when a movement two feet to either side means destruction; or again they may commit suicide by racing ahead directly in front of the wheel. This species has a curious "hop, skip and a jump" method of locomotion so entertaining that at first one tries hard to avoid shedding blood, but needless, and often fruitless, effort in this direction induces a callous disregard for their fate. It is of interest to note that *Citellus columbianus* in certain districts of British Columbia, where this species is a road-loving animal, rarely is killed by motor cars.

East of Coleman in a field of young oats stood twelve Long-billed Curlew, nine young birds and three adults, so tame as to cause wondering comment. To three men and two teams working a hundred yards away they paid no attention, neither did they flush when the car passed within ten yards.

On this first prairie day we camped in a straggling line of cottonwoods, the only timber for miles, beside the muddy waters of Old Man River These cottonwoods and the purring river were more than welcome. What a boon is a grove of trees on the bald prairie! Overhead the glossy leaves shook and twisted in the wind—pale, clear green when the sun shone through and glistening silver where the light struck at an oblique angle. What a pleasant music this friendly wind made, playing in the cottonwood trees! A Yellow Warbler, more green than yellow in the verdant shadows, haunted the lower branches; a House Wren sang persistently; Crows and Magpies kept passing overhead while Kingbirds dashed out from the tree tops to harry these corvine thieves. Later the wind increased to a blow, bellying out the tent and bending the cottonwood tops until they roared like breakers on the shingle. Not a bird note could be heard in this uproar

On an evening sky of delicate sapphire lay white, tenuous cloud ribbons, and the wind, subdued again, came hot and sweet from the prairie grasses.

A few miles east of Lethbridge on July 14th we encountered the first Desert Horned Larks and from there on these birds were nearly always in sight, flying up in front of the advancing car. McCown's and Chestnut-collared Longspurs were even more plentiful and all three species usually were accompanied by broods of young in first plumage. The male Longspurs still were full of song and sometimes the car was stopped that we



Marbled Godwits and Lesser Yellowlegs

might listen to a black-fronted little chap who, perched on a fence post, trilled his spring song in the heat and dust of the highway.

To reach Many Island Lake from Medicine Hat we drove thirty-two miles north-east through a dry, arid country where bird life was scarce, Shore-larks in family groups being the only species seen in any numbers. It was an extremely hot day and even these desert-loving birds suffered. The only shade along the trail was that afforded by the fence posts and in these little patches of shade one or sometimes two birds rested, crouching on the ground with wings drooping and open bills gasping for air.

Many Island Lake is situated on the Saskatchewan boundary about ten miles north of the main line of the Canadian Pacific Railway. The general aspect of the surrounding region is that typical of south-eastern Alberta, a dry desert country of rolling hills, the home of Desert Horned Larks, and McCown's and Chestnut-collared Longspurs.

Containing approximately twelve square miles of open water and four square miles of marsh this lake is a most important nesting ground for waterfowl. It is exceedingly irregular in shape with deep bays and several long narrow peninsulas, the latter practically dividing the lake in three. In the western portion a perfectly flat, boot-shaped island, 300 acres or more in extent, is separated from a wide peninsula—extending to north-west into open water from its marshy base on the south shore—by a channel which at its narrowest point is less than 100 yards in width; while two mainland pensinulas, jutting out from the north side of the lake, all but touch its northern end. During the summer of 1922 the contour of the shore line was practically the same as that shown on the original survey of 1886 but there have been seasons when the water area was much less.

The water is alkaline and in the lake proper the growth of vascular plants is not abundant. Some beds of bog-rush occur in the south-west corner and several species of *Lemnaceæ* are generally distributed. On the north side of the lake are steep sandy hills covered with short grass and sloping to a shore line of hard sand. In some places grass extends almost to the water's edge, in others the margin of grassland is separated from the water by bare stretches scaled with alkali. To the south the littoral is more level but similar in other respects.

Bird life about the open lake was abundant during my visit in July, 1922. Wilson's Phalaropes, Avocets, Marbled Godwits and Western Willets were plentiful along the beaches while Franklin's Gulls, Common Terns and Black Terns continually passed back and forth from the marsh which could be seen in the distance. Surface-feeding ducks were too numerous to be counted. Besides many mated pairs of Gadwall, Baldpate, Shoveller, Blue-winged Teal and Mallard we found a concourse of apparently non-breeding females and males assuming eclipse plumage. These gatherings were composed of Mallard, Baldpate and Pintail. Few Lesser Scaups and no White-winged Scoters were present, the common diving-ducks being Canvas-back and Redhead, the former in pairs, the latter in flocks of considerable size. Red-winged and Yellow-headed Blackbirds, visitors also from the marsh were constantly in sight; Brewer's Blackbirds in large flocks hunted grasshoppers on the dry, grassy hills, and Lark Buntings were fairly common.

But it is the marsh that offers the greatest attraction. No one who has ever seen this expanse of waving green can forget its charm. Viewed from the north side of the lake it appears as an interrupted tule and bog-rush marsh lying in a depression between barren hills; but exploration reveals deep channels of open water, isolated ponds of various sizes, and, here and there through the entire marsh, dry, grassy islands rising only a few feet above the water. It is to these islands that the lake owes its name. This portion contains nesting grounds suitable to the needs of many different types of birds—dry islands for the pond-ducks, heavy rush growth for Redhead, Canvas-back and Ruddy Duck; wet, grassy areas for Rails, and deep-water marsh for Franklin's Gulls, Red-winged Blackbirds, Yellow-headed Blackbirds and Marsh Wrens.

On a warm June day in 1921 a considerable portion of the marsh was traversed while birds rose at almost every step and a medley of bird-voices filled the air—seemingly each ecologic niche was filled to capacity. Everywhere over the waving rushes in clamorous excitement circled Franklin's Gulls, while from the dry hills to the north they came in a steady stream, no doubt carrying grasshoppers to their young. Larger Gulls, probably Ring-bills, in lesser numbers were seen, but, a breeding colony said to occupy one of the islands far out in the marsh, I was not fortunate enough to discover. Low-flying ducks passed continually and many others rested on a series of mud-bars close to the edge of bordering rushes along a lane of open water.

Human intrusion in this great bird city caused merely a ripple of excitement amongst its tenants; ducks, disturbed from the mud-flats, splashed into the water or dropped only a few yards away,

out of sight behind concealing rushes; grasshopper-laden Blackbirds (Red-wings and Yellow-heads), flying from the grass-flats, held a straight course to the hidden nests which were their objectives. Even the Franklin's Gulls soon quieted down, their dissonant clamour, first all but deafening, becoming merely an accompaniment to the more interesting vocal efforts of less insistent performers.

Through the long, hot summer day for ever beats the steady, throbbing pulse of this marsh world—an oasis of eager life amongst the low sun-bleached hills shimmering in the heat-haze. Stilled for a few night hours, an early dawn awakens renewed activity, and, day after day, week after week, each plant, each living organism, insect, mollusc, crustacean, plays its destined part, until with late summer comes the consummation of all this effort—a crop of water-fowl ready for the great adventure. Here is no poisoning of water by organic waste—the rank, lush vigorous growth absorbing previous years' decay. Here the deep surrounding water discourages animal predators, and, with no nesting trees for many miles, the crow is not a menace—*this* is a bird haven.

PAKOWKI LAKE, ALBERTA

Travelling the seventy miles from Medicine Hat south-west to Pakowki Lake—part of the way over grass-grown prairie trails—we passed many dead Horned Larks and Lonsgpurs These had been killed by motor cars. When flushed by an approaching car these small birds sometimes fly straight ahead a foot or so above the ground, and, on being overtaken probably make a quick bewildered effort to escape from underneath the body of the car. Some of course do escape but a great many strike some part of the car and are either stunned or killed outright. Specimens dissected usually showed contusions on the head or more rarely on the breast. Occasionally, also, broken-winged birds are found fluttering along the roadside. When driving fast, try as one will, it is sometimes impossible to prevent accidents of this kind, and, without knowing it, unobservant drivers probably run down numbers of birds.

The ranch where we camped for the night is on the margin of the lake—so-called—for from this point anything more unlike a lake would be difficult to imagine. This portion—originally a wide channel between Big Island and the mainland, now bridged by a graded road—was entirely dry save for a few muddy pools and a small area of moist ground where sedges flourished. We had looked forward to camping under trees at Pakowki Lake; but the only trees in view, five or perhaps six, stood on an island several miles away. So the tent was hitched to a fence post.

In its surroundings of flat, treeless, arid prairie the strongly alkaline Pakowki Lake, otherwise known as Bad Water Lake, did not inspire much enthusiasm. In July, 1922 the water area approximated fifteen square miles with a maximum depth of two feet. Although a considerable portion of the lake bottom was exposed and grown up with skunk grass, and the water's edge two hundred yards or more below the well defined high water mark, nevertheless the lake was higher than had been the case for several years, so I was informed.

Standing on the end of a long stony point that forms the south-west corner of the Big Island (joined to the mainland for years past) a good view of the lake was obtained. In the distance, to the south-east, appeared islands of considerable extent on which grew a few poplars of tree-size, and between these and the point could be seen several smaller rocky islands where California Gulls and Common Terns rested. The end of the point, the small islands and the surrounding water were covered with a multitude of Pintail—wherever the eye rested, in the air, on the water or shore, were Pintails. Far out in the shallow lake many were dipping, others idled along the fringe of bog-rush that outlined the north shore of the island, while those on shore rested and cleaned their plumage. I examined several hundred individuals closely, a great many flocks as carefully as possible, and, with the exception of one nearly full-grown brood led by a female, all these birds were adult males in eclipse plumage. Eight thousand Pintail would be a most conservative estimate of the number present on this portion of the lake. I walked down the point while flock after flock arose from the beach or the water and settled again among the black masses of birds on the islands. Before the last flock on the extreme end of the point rose in the air I was within thirty yards and a most careful scrutiny with binoculars failed to reveal a single female or young bird. Along the point for about half a mile from the end and extending inland about one hundred yards the beach was littered with feathers and droppings.

Some miles to the north on the mainland shore a brood of nearly full-grown Mallard was encountered, this and the brood of Pintail before mentioned being the only evidence of breeding ducks. Avocets were common and apparently breeding. Two pairs of Marbled Godwit, one accompanied by downy young; one pair of Bartram's Sandpiper; three Wilson's Phalarope; a

flock of Pectoral Sandpipers and numerous Killdeer, completed the list of water birds observed.

In an ancient, solitary willow, dwarfed of stature, gnarled of trunk, and having the depressed crown seen on timberline spruces—the result of weathering countless prairie gales—a pair of Ferruginous Rough-legs had their nest. Upon our approach both birds, dark male and pale female, appeared on the scene and showed considerable concern as if young birds were being fed. But the flattened, weathered nest was evidence that the young had departed much earlier and on the ground below was an addled egg still intact

On my next visit, July 10th, 1926, the lake was entirely dry. Across miles of alkali-encrusted mud could be seen, in strange wavering outlines, the distant shore line dancing in the heat. About a small spring-fed slough, a few hundred yards in circumference, we noted a few Red-winged and Yellow-headed Blackbirds, a gyrating Wilson's Phalarope, and a pair of Marbled Godwits. A pair of Killdeer and their full-grown brood had taken possession of a small pond originating in the overflow from an artesian well on Big Island —a legacy from a defunct Oil Company. These were the only birds seen.

(To be continued)

BIRD NOTES FROM THE CANADIAN LABRADOR, 1928

By P. A. TAVERNER

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REPRESENTING the National Museum of Canada, I spent the summer of 1928, assisted by the late Mr. C. G. Harrold, on the north shore of the Gulf of St. Lawrence from Matamek[1] to Natashquan.[2] Most of the time, June 2 to July 13 and August 8, was spent at Matamek as guests of Mr. Copley Amory to whom many thanks are due for courtesies and assistance. Various side trips of from a day to a week in length were made from here; to Lac Marchand, about eight miles inland and to points along the coast in the neighbourhood of Point St. Charles that marks the eastern horn of Moisie Bay. July 13 to 27 were spent at Havre St. Pierre[3] with a trip July 16 to 22, to Betchewun and St. Genevieve Island about 25 miles beyond, across to Anticosti, coasting from Charleton Point to East Cape and return to Charleton Point and directly back to Havre St. Pierre. July 27 to August 7 we were at Natashquan.

For the purpose of limitation of field, various ornithological writers have arbitrarily taken Seven Islands Bay as the western limit of the Canadian Labrador. It extends eastward to the Strait of Belle Isle where the true Labrador begins. Attention may be called here to the fact that the term "Labrador" has progressivley been restricted in its application. Originally including this north shore of the Gulf of St. Lawrence, it is now only properly applied to the outer or Atlantic coast of the Ungava Peninsula, and is under the administration of Newfoundland and is not in any sense Canadian territory. The old "Labrador" of Audubon's Journal is still called locally and vernacularly "The Labrador" but is properly only the coast of Saguenay County, Quebec, or, more familiarly "The North Shore", "Côte Nord" or "The Canadian Labrador".

All the coast surveyed by us this season is wooded. Though the timber gradually decreases in size eastward, the bare, typically arctic conditions that we traditionally associate with The Labrador do not occur west of Natashquan except on the exposed points and the smaller islets.

Gavia immer, COMMON LOON.—Loons were common all along the coast throughout the summer. We presumed that they bred on the small inland lakes nearby as stated by the residents but could not verify the supposition. None were noted on Lac Marchand as we passed along it, though it seemed an admirably adopted water for their use. A very large proportion of birds seen through the summer on the sea were obviously juvenile and probably many more, that at field-glass range seemed adult, were submature. A specimen taken June 8, in complete soft gray, white throated, plumage of the young, is certainly at least a year old. Another, July 7, not quite in complete mature plumage, cannot be under two years old and still not in breeding condition. It seems from this that the species does not arrive

[1] The site of the original Moisie trading post, at the bottom of Moisie Bay, eight miles east of the mouth of the Moisie River, about twenty miles east of Seven Islands Bay and in longitude about 66° W.

[2] Due north of the extreme eastern tip of Anticosti Island, longitude about 61° 45′ W.

[3] Eskimo Point of all but the most recent authors and maps, about half way between Seven Islands and Natashquan.

at full breeding maturity until at least three years old. On our small inland lakes where Loons breed commonly we see none but fully adult birds, except of course the offspring of the current season. Young birds after leaving the breeding lakes in the fall do not return to them until mature some three years later. Our experience on this coast suggests that they spend this time of adolescence at sea or, perhaps, on the very largest lakes.

Gavia stellata, RED-THROATED LOON.—Red-throated Loons were common on the lower St. Lawrence River during our descent at the end of May, but none were seen at Matamek. Beyond Havre St. Pierre they were more or less common and a pair making daily flights inland over a constant course during our three days detention by storm at Fox Bay, Anticosti Island, suggested that they were nesting within the island. The species does not seem to breed commonly until the barren coast beyond Natashquan is reached.

Fratercula arctica, ATLANTIC PUFFIN.—I have no evidence of Puffins breeding on this coast west of Mingan. None were seen near Matamek. July 22 in the open channel, practically at sea, about half way between Charleton Point and Havre St. Pierre, two Puffins were taken. They have the blackish facial colourings and small bills characteristic of winter plumage. The legs are dull yellow with only a faint suggestion of the brilliant red of the nuptial condition. They are not birds of the year and must therefore be at least a year old. It is evident from these that Puffins require at least two years to come to maturity. We never (?) see this plumage in the vicinity of breeding colonies where even the young of the year disappear immediately on taking to water. They evidently go directly to sea and do not return to coastal waters until adult and ready to breed. Specimens in winter or juvenile plumage are very rare in collections, probably due to these pelagic habits.

Uria troille, COMMON MURRE.—Not seen until we reached the vicinity of the Egg Island Bird Reserve near Betchewun about twenty miles east of Havre St. Pierre. Here a considerable number were noted on the sea and the shore cliffs though none were actually ascertained to be breeding among the many nesting Puffins and Razor-bills. If they were nesting here it is a new development in their history, probably induced by the protection offered by the sanctuary. One moulting bird was taken in the vicinity, an adult without flight feathers, suggesting that this species, like the Razor-bill (which see) may have a flightless mid-summer season.

Alca torda, RAZOR-BILLED AUK.—Not noted breeding west of Egg Island Bird Reserve beyond Havre St. Pierre. One in full nuptial plumage was taken at Matamek June 7, but it was in reduced physical condition. On our return to Matamek in August, Razor-bills were quite common scattered in small loose groups over the sea in the neighbourhood of Point St. Charles but did not come inshore to the bottom of the bay. August 14 and 20 a number of adults moulting from the black-necked nuptial to the white-throated winter plumage were taken. They had already shed their deciduous bill sheaths, had dropped their flight feathers and were flightless. This species like the Murre and the Puffin deserts the neighbourhood of their nesting rookeries just as soon as the young can take to water and are no longer seen thereabouts. Presumably they go to sea where their numbers are lost in the vast waste and are most difficult to observe or collect. It is evident from these specimens that the species has a flightless midsummer moult like many of the ducks, a fact that hitherto seems to have been overlooked by ornithologists through the difficulty of observing pelagic conditions or of obtaining specimens during the short critical period. At the same time a three-quarters grown juvenile was taken. Though scarcely out of the down, in colour it is a softly-textured immature reproduction of the adult nuptial plumage, with the white streak from the bill to over the eye well developed, showing that this species like its near relative the Dovekie, has a plumage between the natal down and first winter plumage resembling that of the breeding adult.

Rissa tridactyla, KITTIWAKE.—At Gull Bay, just round the eastern finial of Anticosti Island, to the north, was found an enormous nesting colony of Kittiwakes. Most of the north shore of the island is perpendicular, unbroken cliff about two hundred feet high. For two miles along the slight indentation of Gull Bay the face is covered with Kittiwake nests. By counting a section and multiplying it by the length occupied, I estimated the population at from 60,000 to 75,000 nests. Associated with them were a few Gannets and Common Cormorants and a great number of Common Murres.

Larus hyperboreus, GLAUCOUS GULL.—On our way out of the upper gulf we saw several white-winged gulls from the steamer. On the first days of our arrival at Matamek one was seen several times passing along the shore. June 9 one was shot by a fisherman and brought to us. It was a male but so small that until I got it home and compared it with specimens I referred it to *leucopterus*, when its true identity became obvious. It is evident from this specimen that sight distinctions between these two species, even

in the extreme east, where *hyperboreus* is supposed to be of the large race, may be very uncertain.

Measurements.—Wing, 435 mm. Exposed culmen, 56. Height of bill at base, 17.7; at gonys, 19. Tarsus, 72. Middle toe and claw, 77.

It will be seen that these measurements fall well within those given for *L. h. barrovianus* as given by Oberholser, (*Auk*, 1918, 472) and had this specimen been taken in the west there would have been no hesitation in regarding it as a demonstration of that race. As it is, it shows that *barrovianus* is so slightly differentiated from *hyperboreus* that it cannot be recognized with certainty by its inherent characters.

The specimen is a juvenile and, while it may not have yet attained its full size, is at least a year old and I cannot think it would ever increase in size sufficiently to alter the above conclusions. It is well here to call attention to the suggestion made by Bernhard Hantzsch, (*Can. Field-Nat.*, XLII, 1928, p. 124) that the great variation in the size of gulls may be caused by spells of bad weather cutting off food supplies at critical stages in the growth of the young. The bird is in the pure white "*hutchinsi*" plumage which I am convinced is acquired by fading from the ashiness of the juvenile colouration, by which process I have seen Glaucous-winged Gulls (*L. glaucescens*) very closely simulating this species. There are numerous new feathers of an incoming plumage on various parts of the body. It is important to note that this plumage succeeding that of the yearling bird is pale ashy brown as if it were going to wear an ashy mottled plumage a second summer. The bill is flesh-coloured with a blackish tip back to and including the gonys.

My conclusion from this specimen and a rather large series of the species in our collection is that *L. h. barrovianus* is a very uncertainly recognizable race, that the white or "*hutchinsi*" plumage is derived from the light ashy juvenile by fading and that the second summer's bird retains a large amount of ashy brown and may not begin to acquire an adult blue mantle until the third summer.

Sterna paradisæa, ARCTIC TERN.—The Common Tern was nesting on numerous islets all along the coast. In these terneries there may have been more or fewer Arctic Terns whose occurrence was not determined. Although all flocks of Tern were carefully studied, the only Arctic Tern positively identified before we reached Natashquan was one taken by the chance, wanton shot of a fisherman from a flock of supposed Common Terns near Matamek, June 7. Birds were scrutinized carefully and a number that seemed to show longer tails, all-red bills or grayer underparts were shot. Examination in the hand of these specimens usually corroborated the characters seen in life, but until August 5 at Natashquan all were Common Tern. On an island near the latter place we picked out Arctics from a large flock of Commons three times in five. We had no opportunity of contrasting the shorter leg length of the Arctic Tern on the ground, but arrived at the conclusion that on the wing there is no field mark by which individuals of the two species could be certainly distinguished. Numerous Common Tern seemed to have unusually long, flowing tails, the dark tip to the bill may be so small as to appear entirely absent at even relatively close range and the underparts may darken to a confusing degree. Undoubtedly birds in mass where these characters in typical degree are many times repeated may be determined with considerable accuracy but individuals can be made out only with approximate certainty, at least without much greater experience with the species than most of us can have.

Phalacrocorax carbo, COMMON CORMORANT.—The trip to Gull Bay at the northeast end of Anticosti Island was made to investigate a report of these birds nesting there. July 17 we crossed from St. Genevieve Island to within a mile or so of Charleton Point, Anticosti, and then coasted along the shore eastwards to our objective. The coast here is a succession of very bold, broad headlands faced with smooth, perpendicular cliffs from 200 to 400 feet high, divided by wide open bays heading in small stream valleys There are only two harbours approximately safe for boats along this seventy-five miles. We lay for one night in one of them, Salmon River, and proceeded to Gull Bay the next day, arriving about noon. Owing to the wind blowing up we stayed here only an hour or so and put back to Fox Bay where we were detained by heavy weather for three days. We then retraced our course back to Charleton Point and struck across directly to Havre St. Pierre July 22nd.

The water along this inhospitable coast is shoal and, in safety, we could not follow it very closely except when we cautiously felt our way in to land on the narrow tidal shore line. Mostly we passed at a distance of from a quarter to half a mile, close enough to see the narrow horizontal white-wash lines of the Cormorant rookeries and count the black occupants standing like rows of tall black bottles, but, as field glasses are practically useless on a throbbing, heaving gas boat, were not close enough to observe details. We noted Cormorant rookeries as follows:

Observation Point	20 nests
Point between	9
Guy Point	11
About six stations to Gull Bay, averaging 10 nests each	60
Total	100 nests

These nests ranged from about twenty feet up from the water to 200 and were absolutely inaccessible except by means of ropes from the top. They seemed in no wise different from the nests that Double-crested Cormorants would build in similar situations. A few cormorants occupied a ledge at the top of the Gannet and Kittiwake rookery at Gull Bay, but it was uncertain whether they were nesting there or just loafing.

On the way to Gull Bay we hurried along on our course as we were anxious to reach it before the weather changed for the worse and did not examine any of the rookeries closely. Cormorants were seen flying to and from the rookeries and passing the boat but always at a respectful distance, and as glasses were useless from the boat we could only guess at their identity. They looked indistinguishable from Double-crests as a rule, and it was not until the return trip that we definitely established their identity as Common Cormorants. At sea without objects for direct comparison in size and distance, apparent size is a very uncertain criterion. Occasionally we got glimpses of light throat-patches, but never clearly enough to satisfy ourselves that they were not extensions of pale yellow gular pouches on the smaller species. No cormorants have crests or plumaceous ornaments at this season of the year and there was no sign of any white flank spots or "watch pockets" visible on any of them. In specimens collected later, only a few showed a few white filaments of this latter character still unshed.

On our return trip, the weather being momentarily fine and calm, we landed on the narrow talus fore-shore left bare by the tide or came close inshore at three points along the route and collected specimens. All birds so obtained or seen at close range were Common Cormorants and it is assumed that all the Cormorants seen were the same. The young birds on the nests were from a quarter to half-grown in size, but still covered with dense black down. Most of the older birds seen about the rookeries seemed to be adult in plumage but there were far more of them than the number of nests justified. At several rookeries there were small groups of brown, light-breasted juveniles gathered a little to one side of the nest ledges. These usually left at our first approach and did not return until after our short visits were over.

Visiting a small rookery of Double-crests later at Natashquan we found the proportion of grown birds present to occupied nests about 15 to 1. From general impression this does not seem to be far from the state of affairs shown in these rookeries. Considering that undoubtedly a number of birds are away fishing at any one time this is probably not an excessive proportion between nests and breeding, non-breeding and adolescent birds. This would give an estimate of 1,500 birds as the Common Cormorant population of this strip of coast—by far the largest number of the species that has been reported from this continent of late years. We made inquiries as to whether these series of rookeries extended west as well as east of Charleton Point but the bar of language, the residents being practically all French-Canadians with little or no English, and the uncertainty of identification made them barren of satisfactory information.

The marked reduction in number in this species in the Gulf of St. Lawrence since Audubon's time is remarkable, especially as during the same period in the same locality the Double-crested has held its own. Here are two species of apparently very similar requirements of food, nesting and general ecological conditions living side by side, yet one declines to the vanishing point while the other persists undiminished. The Common Cormorant does seem to demand more inaccessbile nesting ledges than does the Double-crest and as far as we know never occupies for nesting purposes low islet or ground colonies as does that species. On the other hand the Double-crest often nests on the same fordidding cliffs as the former and often on adjoining ledges as I have seen near Cape Whittle along this same North Shore. The Common Cormorant seems to go to sea for food rather than to the estuaries and bays as does the Double-crest but this does not seem to suggest any important factor in their reduction. Man can have no direct influence in the selection for though he may harry some rookeries, he would do so indiscriminately as between the species, in fact the more accessible sites of the Double-crest would suffer the most. The general conditions do not seem to have altered much on this coast within historical times and in our present state of knowledge the most likely cause for the general disappearance of this species seems to be disease. We know that closely allied species, or even strains of the same species, show wide variation in their resistance to certain diseases. It is not unlikely that this is a key to the question. Perhaps it

was something introduced by white men, perhaps an obscure parasite or organism brought over from Europe by early fishermen with their bait, to which *carbo* is particularly susceptible and *auritus* is more or less resistant. This is pure speculation of course, but when we note the havoc that white man's diseases have played with native populations the world over, it is not too much to speculate upon the effect that such introductions may have on wild life. In fact the effects of imported diseases upon native biota are looming larger and larger in the minds of naturalists and conservators.

Moris bassana, GANNET.—Among the other birds reported to nest at Gull Bay, Anticosti Island, was the Gannet. Gannets have been previously reported here by various authorities, a resumé of which has been recorded (by Lewis, *Can. Field-Nat.*, XXXVIII, 1924, p. 46). Table Head and Sand Point have been given as sites of gannetries. Both of these are points along the coast we travelled but saw no evidence of Gannets breeding on them and it was not until we reached Gull Bay that any nesting birds were seen. At Gull Bay we found about 500 nests scattered among those of the Kittiwake. The known rookeries of this species in the New World now are—Bonaventure Island, off Percé near the tip of the Gaspé Peninsula; Bird Rock off the Magdalen Islands, in the middle of the Gulf of St. Lawrence; St. Mary's Point, southern Newfoundland and this Gull Bay, Anticosti Island. There are a few other rookeries known to have been deserted within historical times, notably Perroquet Island near Mingan, opposite the east end of Anticosti, and a couple of sites in the Bay of Fundy

The first part of our stay at Matamek was notable for the lack of "bait"—small fishes like lance, capelin and squid—food of commercial species. Consequently large fish-eating sea birds were not very numerous. An occasional Gannet was seen winging by and a few gulls of the locally nesting population. July 13, as we approached Mingan on the steamer, Gannets became very numerous and in places the sea was speckled with their white forms that took to wing in long, straggling lines when the ship approached too closely. When we returned to Matamek, August 8, conditions were quite different. Though the capelin season had passed, lance were in and the season for squid was on. Large flocks of Gannets were a common sight passing up or down coast or gathered together in solid bunches diving like innumerable plummets into a patch of sea boiling white with agitated life. Most of these birds were plainly adult and almost certainly many were breeding. The nearest nesting colonies to here are those of Bonaventure Island and Gull Bay, the former 150 and the latter 210 miles distant in a straight line. It is evident that the species regularly forages at very considerable distances from its nesting stations

Limnodromus griseus, DOWITCHER.—The species has been recorded as far east on the Gulf as Godbout (Merriam, 1882) and on the southern part of the Outer Labrador, but never definitely reported from the North Shore. July 20 at Fox Bay, Anticosti, Harrold saw two in full red-breasted plumage at close range, and another at Natashquan on the 30th. Circumstances prevented collection in both cases but Harrold's demonstrated familiarity with the waders is such that I cannot question his sight record of this species.

Arquatella maritima, PURPLE SANDPIPER.—June 5, on the rocky shores of a small islet near Point St. Charles eight Purple Sandpipers were observed and five taken. This is a very late date for the species in this latitude.

Totanus melanoleucus, GREATER YELLOW-LEGS.—From the actions of a bird occasionally seen in the summer flying in circles high over head and calling loudly as if in mating ritual at Matamek, we suspected that it was breeding nearby but failed to find further evidence of it. They became increasingly common after July 15.

Totanus flavipes, LESSER YELLOW-LEGS.—A very rare bird on the coast. Harrold recognized one at Natashquan August 4th, and four at Matamek the 21st.

Vanellus vanellus, LAPWING.—The National Museum of Canada has received through Harrison F. Lewis a specimen of Lapwing taken at St. Augustine, near the Strait of Belle Isle, longitude about 58° 54′ W. by Mr. Thomas Kennedy, a resident, about December 15, 1927. This constitutes the first record for the Canadian Labrador and is another record for the great transatlantic flight from Europe of 1926-27 reported at length by H. F. Witherby in *British Birds* (1928, pp. 6-13) and *Bird-Lore* (XXX, 1928, pp. 248-52).

Chætura pelagica, CHIMNEY SWIFT.—The first day of our arrival at Matamek, June 2, a single Chimney Swift was beating up and down over the beach in company with a flock of Tree Swallows. It was not seen again. This seems the first record for the species on the main land east of Point des Monts though Lewis (1924) has reported it from Anticosti.

Empidonax minimus, LEAST FLYCATCHER.—Singles noted June 3, 13 and 21 and August 19 and one taken June 13. This seems to be the first record for the species on the Canadian Labrador.

Molothurus ater, COWBIRD.—A single female was noted gleaning from the sand in front of the

house at Matamek June 26. Two days later a pair were seen in the same place and August 12 one was taken near by. This appears to be the first record for the species on the Canadian Labrador, though it has been recorded at Point des Monts (Comeau, 1904) and on Anticosti (Lewis, 1924).

Quiscalus quiscula, BRONZED GRACKLE.—This species has evidently been extending northward in this direction of late years. We noted one at Havre St. Pierre, half a dozen at Fox Bay, Anticosti, and several at Natashquan where one was taken.

Petrochelidon lunifrons, CLIFF SWALLOW.—The Cliff Swallow has only been reported once east of Point des Monts (Johann Beetz Bay, about 45 miles east of Havre St. Pierre, Townsend, 1917). A single bird was observed flying with the small resident flock of Tree Swallows over the beach at Matamek, June 21. It has been reported from Anticosti Island (Verrill, see Townsend and Allen, 1907) but Lewis (1924) informs us that the colony mentioned at Cape Eagle no longer exists.

Vireosylva philadelphica, PHILADELPHIA VIREO.—Quite common about Matamek and a number of specimens taken. The nearest previous record seems to be Tadousac (Dwight, 1897) and Gaspé, across the Gulf (Townsend, 1923).

Vermivora celata, ORANGE-CROWNED WARBLER.—One juvenile taken at Matamek August 11. The nearest previous record for the species is Montreal, except for a specimen in the collection of the National Museum of Canada taken on shipboard off Point des Monts October 2, 1923, by J. D. Soper. This is one of the rarest warblers in Eastern Canada. Nowhere east of Manitoba does it seem to be more than a rare or casual migrant. With the small amount of work that has been done on land birds in this extreme eastern locality the taking of two specimens is of extreme interest.

Dendroica castanea, BAY-BREASTED WARBLER.—One taken at Matamek June 11. The only other previous record east of Point des Monts is a single individual at Piashte Bay (Johann Beetz Bay, Lewis, 1922).

Wilsonia canadensis, CANADIAN WARBLER.—The status of this species on the North Shore east of Point des Monts is based on very generalized statements, though Lewis (1924) records reports from Anticosti Island. One specimen was taken at Matamek June 12.

Certhia familiaris, BROWN CREEPER.—The species has been noted by Lewis (1926, 1927, 1928) at Seven Islands, Natashquan and Anticosti. It was seen almost daily at Lac Marchand where it favoured us with a delightful little warbling song a number of times. One was taken at Matamek June 29.

Penthestes hudsonicus, BROWN-HEADED CHICKADEE.—A special effort was made to obtain specimens of this species for the purpose of evaluating the form *P. h. nigricans* described from this coast by Townsend (*Auk*, 1926, p. 74). In consequence a series of fourteen specimens with representatives from practically every point visited, including Fox Bay, Anticosti, was collected. A comparison of these with specimens from Ontario and northern New Brunswick convinces me that the proposed subspecies is founded upon young birds of the year that are consistently darker and sootier than the adults, and should not be recognized as a distinct subspecies.

THE GREAT HORNED OWL IN MANITOBA[1]

University of Oklahoma, Norman, Okla.

By RALPH D. BIRD

"MY AMPLE opportunities for observing these interesting birds in captivity as well as in a state of freedom, and indeed all that I have seen of them—their untamable ferocity, which is daily more apparent; their magnificent bearing; their objection to carrion, and strictly carnivorous tastes—would make me rank these winged tigers amongst the most pronounced and savage of the birds of prey." So Mr. C. W. Nash closes his interesting note on these owls,[2] and after a study of them and their food habits about Birtle, Manitoba, the writer feels that he can fully reiterate Mr. Nash's statement.

In March, 1928, the Great Horned Owl (*Bubo virginianus*) was found to be present in rather unusual abundance in the vicinity of Birtle and quite probably throughout the poplar savanna,

[1]Contribution from the Zoological Laboratories of the University of Illinois No. 339.

[2]Seton, E. T., 1890, The Birds of Manitoba. Proc. U.S. Nat. Museum, Vol. XIII, No. 841, 0p. 545.

at least in the more eastern parts of Manitoba and Saskatchewan. One nest was observed from the train window near Esk, Saskatchewan, and by searching on foot two others were found, one near Foxwarren and one near a marsh in the vicinity of Solsgirth, Manitoba. After a more careful search than in the other localities, five nests were found within a few miles of Birtle. A large number of pellets were gathered from the vicinity of the Solsgirth nest and four of the Birtle nests were kept under observation until the young had flown. The fifth nest, unfortunately, was destroyed and the female shot by some thoughtless individual, was found lying on the ground below the nest on April 19. The weather being cool she was in perfect condition so that it was possible to preserve her skin. On examining the stomach it was found to contain mice and the remains of a muskrat (*Ondatra zibethica*), probably taken from the Birdtail river which ran within 75 yards of the nest.

NESTS

It was estimated that there was on the average one pair of nesting birds per square mile of suitable wooded country. Usually old crow's nests were utilized, but in two cases a red-tailed hawk's nest had been used and in a third a hawk's nest had been occupied by the owls in 1927, but in 1928 it was again taken possession of by the red-tails, who built a fresh nest on top of the old one. Owl pellets were found on the ground below. In the old nest were the remains of a rabbit and a flicker which had been partly eaten by the young owls.

Most of the nests were at a height of 20-40 feet in poplar trees well back in the woods, but in some cases they were found in open groves and in more or less isolated trees. Apparently the availability of good hunting grounds was the decisive factor in selecting a nesting site.

Only two young were raised in the nests under observation, but it was not determined if more than two eggs had been laid or whether other young had hatched and perished. They were hatched early in April and left the nest during the first week of June.

BEHAVIOUR

Marked variation in adult behaviour was noted among the different pairs when the nest was approached. One pair was quite timid and flew from the vicinity of the nest when the observer was not closer than 200 yards. A second was quite tame and the female permitted me to climb a tree within 15 yards of the nest and photograph her as she sat on the newly-hatched young. The majority kept at a safe distance and showed their displeasure by loudly snapping their beaks and whooting. Their shyness lessened as the young grew in size and one pair became absolutely fearless and attacked the observer. The nest belonging to this pair was not found until the young were about half grown and happened to be on a tree with large branches descending close to the ground making it easy to climb, which I proceeded to do, the owls in the meantime coming within 10 yards and sitting on neighbouring trees. Besides the two young the nest contained a partly eaten crow, a house rat and a Drummond's vole. Here seemed to me to be the chance of a lifetime to secure close up pictures of an owl and I returned the next day with a camera in high spirits at the thought of obtaining a good set of photographs. I climbed a tree within about 10 feet of the nest and broke off a few branches so that the view of it and the activities of the parent birds was unobstructed. This was a mistake for the opening left a clear road of attack for the owls. They posted themselves on trees about 30 yards distant and on opposite sides of me so that they could not both be seen at once and took turns at flying past and swooping down on me. Flourishing a stick failed to frighten them and the female, being the fiercer of the two, struck with both feet as she went by. The first time only one claw hit me, but it tore my shirt and made a nasty scratch on the arm. The next time she hit me on the head. One claw lacerated the left ear, one the chin and a third made a deep cut within a quarter of an inch of my left eye. With blood pouring from my wounds a hasty descent was made and the attempt to photograph that particular owl was given up.

This is not the first time a great horned owl has been known to attack man. A boy near Carberry, Manitoba, is reported to have lost an eye in a similar manner and the writer can remember being attacked in his boyhood days when climbing a tree to look at some young owls.

FOOD

Visits were made to the nests when time permitted and all pellets and other remains of food collected. Large numbers of both were found under the favourite perch of the male bird which was situated on a large tree at a distance of 75-100 yards from the nest. These were the only pellets found until the end of April when the young became large enough to drop them from the nest. At this time the male deserted his perch and from then on those from the young birds with the addition of a few dropped by the parents in the

vicinity, were the only ones found. In all 112 pellets were collected and examined and their contents are listed in the following table. Five species of mammals [3] occurred commonly and to save space in the table only their generic name is given. They are:—

Drummond's Vole—*Microtus drummondii.*

Red-backed Vole—*Evotomys gapperi.*

White-footed Deer Mouse—*Peromyscus maniculatus.*

Pocket Gopher—*Thomomys talpoides.*

Snowshoe Rabbit—*Lepus americanus.*

Other mammals, birds, etc., as they occur only occasionally are listed in a sixth column.

In estimating the numbers of the smaller mammals in the pellets not only complete remains, but an extra jaw, femur, etc., was taken as representing an individual. As rabbits are large and one individual occurs in many pellets no attempt was made to estimate their numbers and their presence is indicated by *x*.

For convenience in the following table the owls whose nests were kept under observation, were given numbers. They all occupied old crows' nests at a height of from 20 to 35 feet in aspen poplars and were distributed as follows:—

No. 1 was at a distance of about a quarter of a mile from a farm yard in an open grove of poplars at the edge of a cultivated field.

No. 2 was well back in a mature poplar forest on the north slope of the Birdtail river valley. It was about a quarter of a mile from the river and a mile from the nearest farm house.

No. 3 was in a tree at the edge of a small slough in the middle of a poplar grove and at a few hundred yards from a large marsh. There were no farm yards within a mile of the nest.

No. 4 was in a poplar forest at the edge of a well-wooded ravine and at a half mile from a farm yard.

No. 5 was in a small poplar grove at a short distance from a number of small sloughs and at about half a mile from two farm yards.

TABLE OF PELLET CONTENTS

Pellet No.	Microtus	Evotomys	Peromyscus	Thomomys	Lepus	Miscellaneous
Owl No. 1 Collected April 14						
01					x	
02					x	
03			3		x	
Owl No. 2 Collected April 15						
1					x	
2	2				x	
3			1		x	
4	4					
5	3	1				Sparrow or Junco
6					x	(skull)
7	2		1			
8					x	
9	2				x	
10	2				x	
11	2	1	1			Sparrow or Junco (wing)
Owl No. 1 Collected April 23						
12	2		1			*Rattus norvegicus*
13	4		1			*Rattus norvegicus*
14	4	4	2			
15	6					
16	6					
17	5					
18	6					
19	4					
20	4					Sparrow or Junco
21	7					
22	1				x	
23	4					
24	3		1			
25	2					Sparrow or Junco
26					x	
27	1				x	
Owl No. 2 Collected April 25						
28	1	1	5			
29	1	3	1		x	*Blarina brevicauda*
30	4				x	(shrew)
Owl No. 2 Collected May 8						
31				1		
32					x	
33					x	
Owl No. 3 (Solsgirth) Collected May 9						
38					x	
39					x	
40					x	
41					x	
42						Ruffed Grouse and unidentified mouse.
43			1		x	
44						Ruffed Grouse and
45					x	Sparrow or Junco.
46	1				x	Coot.
47	3				x	
48					x	
49		1				Sparrow and *Rattus norvegicus.*
50		3				
51			1			Coot.
52	1					*Rattus norvegicus.*
53			4			
54	1					
56			1		x	
57		2			x	
58	1	1		1	x	
59		1				*Blarina brivcauda* &
60	1		2		x	*Rattus norvegicus.*
61	1		1		x	
62	1				x	
63		1			x	Sparrow or Junco.
64	1				x	
65					x	Ruffed Grouse.
66	1			1		Sparrow or Junco.
67	1					Crow.
68	1					Robin ? & Sparrow ?
69					x	
70	3					
71						Coot.
72					x	
73					x	
74	3					
75	2			1		Sparrow or Junco.
76					x	
77					x	
78	1				x	
79	2	2				

[3]The author is greatly indebted to Mr. Stuart Criddle, Treesbank, Man., for help in identifying the mammals.

TABLE OF PELLET CONTENTS

Pellet No.	Microtus	Evotomys	Peromyscus	Thomomys	Lepus	Miscellaneous
Owl No. 1 Collected May 12						
87					x	
88	2	1	1			*Amblystoma tigrinum* (Salamander)
89	3	1				
90					x	
91		1			x	
92	3					
93	1	2			x	
94	1					*Blarina brevicauda* (shrew)
Owl No. 2 Collected May 27						
110						Sora Rail.
111	1			1		
112	1				x	Mallard.
113				1		
114	2		1	2		
115				1		
116					x	
Owl No. 4 Collected May 29						
102				1		
103				1		Horned Grebe.
104	1				x	
105		1		1		
106	1	1			x	
107	1			1	x	*Blarina brevicauda.*
108	1			1		Horned Grebe.
109				1	x	
Owl No. 1 Collected May 30						
95	1				x	*Citellus franklini.*
96	1				x	Coot.
97					x	Coot.
98					x	
99		1			x	*Citellus 13-lineatus.*
100			1			
101		1		1		
Owl No. 5 Collected June 2						
80					x	Sparrow or Junco.
81				1	x	
82					x	
83						Coot.
84	1					Coot.
85					x	
86						Coot.
Total individuals in	128	30	34	17	—	*Total number of pellets.*
	57	20	19	10	60	

From the foregoing table the following conclusions may be drawn:—

1. As a stable article of diet *Lepus* heads the list. Its remains were found in pellets throughout the nesting season. Out of the 113 pellets examined, 60 contained rabbit remains and 30 of these rabbit only.

2. *Microtus* ranks close to rabbits as an item of food. The greater number were taken in April when the melting snow exposed their winter homes while other small mammals and birds were scarce. It is by far the most abundant mammal in this district and remains of 128 individuals were found in 57 pellets.

3. *Evotomys* and *Peromyscus* form a small but stable article of diet. 30 individuals of each were found, the former in 20 pellets, and the latter in 19.

4. *Thomomys* forms an important food item during the latter part of May at a time when these fossorial forms spend much of their time above ground at night in search of their mates.

5. On their return from the south the migrating birds enter in to the owls' menu. At first a few individuals were taken from the flocks of Juncos and Tree Sparrows, then as the sloughs opened up various aquatic birds of which Coots formed the larger part.

6. The association of prairie forms, such as *Microtus* and *Thomomys*, with woodland species *Evotomys* and *Lepus*, in the same pellets indicates that the owls range over both forest and prairie while hunting.

7. The presence of two diurnal mammals, *Citellus franklini* and *C. 13-lineatus* in owl pellets indicates that these mammals occasionally come out at night, that they were taken in the early morning, or that the owls do some of their hunting by day.

In addition to pellet contents, further evidence as to the nature of the food was gained from feathers and other remains found near the nest It was as follows:—

Owl No. 1.—1 Robin, 1 Buff Orpington, 1 Pocket Gopher, 3 Rabbit heads.

Owl No. 2.—1 Mallard, 1 Coot, 1 Sharp-tail Grouse, 1 Red Squirrel.

Owl No. 3.—1 Crow, 1 Sharp-tail Grouse, 2 Ruffed Grouse, 1 Coot.

Owl No. 4.—1 Crow, 1 Pintail, 1 Coot, 1 Horned Grebe.

Owl No. 5.—1 Coot, 1 Horned Grebe.

Owl No. 6.—1 Crow, 1 Sharp-tail Grouse, 1 Flicker.

To summarize the food of the Great Horned Owl, the following list of animals, whose remains were found in the owl pellets, arranged in order of their importance, will be found helpful:—

Mammals

Rabbit, *Lepus americanus.*
Drummond Vole, *Microtus drummondi.*
Pocket Gopher, *Thomomys talpoides.*
Red-backed Vole, *Evotomys gapperi.*
White-footed Mouse, *Peromyscus maniculatus.*
House Rat, *Rattus norvegicus.*
Short-tailed Shrew, *Blarina brevicauda.*
Muskrat, *Ondatra zibethica.*
Franklin's Ground Squirrel, *Citellus franklini.*
13-striped Ground Squirrel, *Citellus tridecemlineatus.*

Red Squirrel, *Sciurus hudsonicus.*

Birds

Coot, *Fulica americana.*

Horned Grebe, *Colymbus auritus.*

Ruffed Grouse, *Bonassa umbellatus.*

Sharp-tail Grouse, *Pediœcetes phasianellus.*

Crow, *Corvus brachyrhynchos.*

Sparrow, *Spizella monticola* ?

Junco, *Junco hyemalis.*

Mallard, *Anas platyrhynchos.*

Pintail, *Dafila acuta.*

Domestic fowl.

Robin, *Planesticus migratorius.*

Sora Rail, *Creciscus jamaicensis.*

Flicker, *Colaptes auratus.*

Amphibia—*Amblystoma tigrinum* (Spotted Salamander), pellet No. 88.

Pisces—recorded by Seton (*loc. cit.*).

Insecta—Taverner, Birds of Western Canada.

ECONOMIC IMPORTANCE

By this study of the Great Horned Owl in a well settled district it was found that the bird is decidedly beneficial. Although the nests were not far from farm yards, only one domestic fowl was found to have been taken. Apparently there is no danger if the fowl have access to sheltered roosts at night. True, some game birds are taken, but these do not average as many as two per nest and we can easily spare this number in return for the amount of good that is done. The numbers of other birds that they destroy has no economic significance.

Probably the greatest benefit to man by this owl is the destruction of enormous numbers of voles, gophers and mice whose depredations to the grain crops are only too well known. Of not such direct significance, but nevertheless of great economic importance is the destruction of rabbits which are often very abundant, extremely injurious to young trees, and second only to fire as a factor in checking the spread of the forests.

ANNUAL REPORT OF THE McILWRAITH ORNITHOLOGICAL CLUB FOR 1928

DURING the year the McIlwraith Ornithological Club held eight regular meetings, seven in the London Life Building and one in the Normal School Library. There was an average attendance of thirty-six persons at these meetings, which were addressed by W. E. Saunders, T. D. Patterson and E. M. S. Dale, all members of our own Club. On May 25th a special meeting attended by approximately 30 persons was held in the Normal School Auditorium, when Stuart L. Thompson of Toronto spoke on "Birds of the Year".

On May 11th the active field workers of the Club took 150 students of the Normal School on an early morning hike to Saunders' Pond. Each student observed about 35 species, the total list for the morning being 65.

The Spring Round-up on May 24th totalled 102 varieties while the Christmas Census on December 22nd netted 36. The number of birds observed during the year was 183.

The social activities of the Club, both the picnic on June 2nd at Wonnacott's farm attended by fifty members and friends, and the corn-roast held on the grounds of the Queen Alexandra Sanatorium on September 22nd, were very enjoyable affairs.—NINA M. NORTH, *Recording Secretary.*

NOTES AND OBSERVATIONS

BARN OWL IN MANITOBA.—On the late C. G. Harrold's return from a trip to Whitewater lake in October, he told me of a report he had received from a visitor to his camp, of a Monkey Faced Owl in the possession of Mr. Wilfred B. Kirkwood of Deloraine, Man. Interpreting this as a Barn Owl, Mr. Harrold asked me to write Mr. Kirkwood for confirmation. Mr. Kirkwood's reply was accompanied by two excellent photographs, one of which is enclosed herewith, which establish the identity of the bird beyond question. He writes: "This owl was shot just after sundown one evening around the first week in October, 1927, a mile north-west of Whitewater lake on my own farm, this being eight miles north-east of Deloraine. I had this bird set up by J. S. Charlston at Brandon, Man." This constitutes the second record for the species in Manitoba. The first record is represented by a specimen in the collection of the late E. W. Darbey and bears the legend, "Shot at St. Annes, November 6th, 1912"—B. CARTWRIGHT.

SPREAD OF THE EUROPEAN STARLING.—In view of the notes on the spread of the Starling (*Sturnus vulgaris*) in Ontario as published in the October number of *The Canadian Field-Naturalist,* it may be of interest to record the following:

During the morning of August 19th near Kapuskasing, Northern Ontario, I had under observation two small parties of Starlings, consisting of five and four birds respectively, both of which were resting on the bare branches of dead spruce trees. The party of five consisted of two old birds in mature plumage and three birds in immature plumage, presumably a this year's brood. As I watched them through my field glasses, they flew off in a southerly direction keeping directly above and close to the wires of a power-line running between Smoky Falls and Kapuskasing. Now it may have been a coincidence, but it is certainly a fact that when the birds came to an almost right-angle bend in the powerline, instead of continuing in a southerly direction they swerved off and continued to fly directly above the wires. Anyone who has observed the habits of the Starling in England will have noticed their partiality if not preference for telephone wires, etc., as perches, and it has struck me that possibly the Starlings are using the power lines as a means of increasing their range in the heavily forested sections of the Province. I am not suggesting for an instant, that the Starlings are showing super-intelligence by using such means of "transport", but that the natural facilities offered by the power lines as a means of increasing their range, not only for perching and roosting, but because the land is usually cleared for some little distance in the vicinity of the line (and the Starling is naturally an open ground feeder), have given this resourceful bird a chance to extend into the northern parts of the Province.

As Mr. Hoyes Lloyd has said, all information concerning the spread of this species in Canada may be of great value in future years, and I hope that the above notes may be of interest—WILLIAM J. GARNETT.

SONG OF THE ROBIN.—During the spring of 1928 a report appeared in a Toronto newspaper of a Robin, in Wiarton, Ontario, singing the song of the Whip-poor-will with the utmost perfection. I was unable to obtain further information of this bird myself but I have since heard that the account was exaggerated. Be that as it may, the following experience which I had, coupled with the above, seems to make an interesting record.

In early June, 1926, in the District of Parry Sound, approximately one hundred miles northeast of Wiarton, I heard, and observed for several days, a Robin which persistently gave the note of the Whip-poor-will interspersed in its own song. It was a surprise to me, the first time, to hear what I supposed to be a Whip-poor-will singing on a clear, sunny morning. The surprise was no less when I discovered the author.

According to my notes, written at the time, the Robin would commence with its own typical song, then after a few phrases it would seem to become confused and articulate with difficulty, and then would come the clear, unmistakable "whip-poor-will", usually only once, but occasionally twice. The song would cease there, only to be taken up again in a few moments and the same thing repeated. The freakish song did not resemble, merely, the Whip-poor-will's notes, but were an exact reproduction, so far as my ear could detect.

It is conceivable that this was the same Robin heard in Wiarton in 1928. If not, the circumstance is, perhaps even more remarkable. The question is, was this an accidental impediment in the Robin's voice, or did proximity to Whip-poor-wills during the nestling stage have some effect? Perhaps some other readers of *The Naturalist* have had similar experiences.—R. J. RUTTER.

TOWHEE IN FREDERICTON, N.B.—Several times during the morning of May 9th, we heard an unfamiliar bird note or call, but could not locate the bird. In the afternoon a strange bird dropped down on the lawn, quite close to the house. At a first glance we thought it was an oriole, but on looking up the description of these birds we found it was neither the Baltimore nor the Orchard Oriole.

While we watched it, rather puzzled as to what it was, it began to scratch and make the dead leaves fly, much like a Fox Sparrow. Then we took in that it was some sort of a sparrow for it scratched with both feet at once. On turning to the sparrows we soon indentified it as a male Towhee. It stayed around two or three hours, running through the flower beds and over the lawn and scratching the dead leaves under low shrubs, singing its full song quite often

In the new list of the Birds of New Brunswick, which has been prepared by Mr. Wm. H. Moore of Scotch Lake, N.B., the Towhee is listed as rare. When discussing the subject with Mr. Moore, he stated that there were several reports of Towhees having been seen in the south of the province and it was also recorded in the old Chamberlain list of the Birds of New Brunswick. I have not, however, heard any report of its having been seen in the province before, as far north as Fredericton.

There seems to be only one specimen in the collection of birds at the University of New Brunswick, which includes the Boardman collection, and it is labelled "a foreign bird." Evidently it was taken before the modern illustrated bird books were available for purposes of identification and it has not been relabelled since.—MRS. SUSAN K. SQUIRES.

BARTRAMIAN SANDPIPER NESTING NEAR TORONTO, ONTARIO.—On Sunday, May 27, 1928, R. Lindsay and I drove out to a field about one-quarter of a mile south of the Dundas Highway near Islington. On two previous visits to this field (May 29, 1927, and May 13, 1928) we had observed a pair of Bartramian Sandpipers (*Bartramia longicauda*) and felt pretty sure of them breeding there.

We left the highway and walked through a small farm and crossed the railroad tracks. Here we spread out and began searching for the birds. After walking a few hundred yards Bob suddenly called over to me that he had seen a female Bob-o-link running through the grass ahead of him. On going over there he found a nearly completed nest. After marking the spot accurately for observations later, I set off in the direction in which I was heading before. I had gone only several hundred feet and had just passed a row of trees and bushes when up flew two Bartramian Sandpipers not fifteen feet ahead of me. I called Bob over and together we searched for a nest. We carefully hunted through the grass, but no signs of a nest until I happened to wander a little to the west of where we were searching. Here a female flew up, not eight feet ahead of me, and when I ran up four beautiful eggs greeted my eyes.

The nest was composed of dead grasses and poorly made. It was placed on the ground, the same as a Spotted Sandpiper's nest, out in the open field where the grass was quite short and thin.

This, I believe, is the first breeding record for the Toronto region. The eggs and nest are now in R. Lindsay's possession.—C. E. HOPE.

BLUE-GRAY GNATCATCHER AT TORONTO, ONTARIO.—About 3 minutes walk from our home lies a wooded ravine. Though not extensive, its variety of habitat makes its a splendid spot for bird observation. In addition to grassy bogs and a little cat-tail marsh in its depths, it is possible to stand on the hillsides at various altitudes and look directly into any chosen level of budding twigs—an ideal situation for warbler observation.

On May 5 Mrs. Thompson and I made a short trip to this ravine to give the warblers special attention. We had parted a little in our wandering, but she joined me hastily to say there was nearby a small bluish bird unknown to her, flitting about, and singing an unfamiliar song. We found the bird very active. One moment high in the tree, then with a sweeping curve coming into the lower branches. It was impossible to place the glasses on it for more than a few seconds and then through a maze of twigs. It disappeared shortly after, leaving us still in doubt as to the bird's identity. Finally to our satisfaction it came again into sight and gave us several clear views in an tree in the open, where we saw plainly it was a Blue-gray Gnatcatcher.

It was too much merely to see such a rarity, so, leaving Mrs. Thompson to keep the bird in sight if possible, I went home for the gun. On my return I found that the Gnatcatcher with all its activity had not travelled very far, having worked its way only a little farther up the hill where I secured it.

It proved to be a splendid male in full plumage. Referring to past records of the bird's occurrence here, I find Mr. Fleming reports it as being taken on only three occasions, viz., May 9, 1885, May 5, 1891, May 10, 1900—this making the fourth for this locality.

I have only one other previous record personally. On May 3, 1922, while in a similar locality, north of the city, I distinctly saw a small very active bluish bird, with all the markings and actions of a Blue-gray Gnatcatcher flitting silently about the twigs of a tree. Next minute it vanished leaving me tormented by a distressing doubt ever since—hence my anxiety to secure this one to-day.

I would describe its outstanding characteristic as restless activity, which accounts for its sudden disappearance. Not only did it flit out of sight, but its movements often brought it among numerous other small birds of the twigs and only the bird-student knows what this means.

Its song, as we heard it to-day, was a low, quiet twittering warble of several notes, uttered in a hesitating manner, somewhat resembling that of a Ruby-crowned Kinglet in character, but lacking the full rich notes of that gifted little songster.—STUART L. THOMPSON.

STARLINGS AT MINER BIRD SANCTUARY.—About fifteen years ago it was noticed that robins stayed at Point Pelee all winter and by dissecting one stomach it was found they were living on the seeds of red cedars growing in that vicinity. We at once secured several hundred of these red cedars and planted them on the bird sanctuary

here at Kingsville. About the fifth year they started to bear fruit quite plentifully and we soon found that we had robins and cardinals staying with us all winter, living on these little blue berries. For some five to eight winters these birds were here in goodly numbers, especially robins, but during the last two winters we have had practically none, because the European Starling has flocked here in such numbers that in less than a week they cleaned every berry off our red cedars. Consequently robins and cardinals had to migrate elsewhere for food. We have had numbers of Starlings stay here from August until early winter roosting in our trees, and most of them would migrate when winter set in, but this year we are having three hundred to five hundred visit the sanctuary each day. How to control and reduce them is a problem.—MANLY F. MINER.

SPRING EXCURSIONS

1. GEOLOGY—Val Tetreau, Saturday, May 4th, commencing at 3 p.m. Take Hull Electric Railway at Chateau Laurier at 2.30, and meet at Monument, bottom of Main Street near Ottawa River.

Leaders; Dr. F. J. Alcock and others.

2. AMPHIBIANS AND OTHER NATURAL HISTORY—Gatineau Point vicinity, Saturday, May 11th, starting from Rockcliffe Ferry at 2.30 p.m. Take Rockcliffe Street Car. Leaders; Messrs. Andrew Halkett, Clyde Patch, C. H. Young, C. E. Johnson, and Dr. R. M. Anderson.

3. BIRDS AND OTHER NATURAL HISTORY—Fairy Lake vicinity, Saturday, May 18th. Take Hull Electric Street Car at Chateau Laurier for Wrightville at 2.30 p.m. Leaders; Dr. Ralph De Lury, Mr. Hoyes Lloyd, Dr. R. M. Anderson, C. E. Johnson, Mr. Andrew Halkett, and Dr. H. M. Ami.

4. BOTANY AND OTHER NATURAL HISTORY—Britannia-on-the-Bay, Saturday, May 25th. Meet at Ottawa Electric Railway Terminus at Britannia at 3 p.m. Leaders; Mr. G. A. Miller, Miss E. M. Cowan, Miss Faith Fyles, Dr. M. O. Malte, Mr. Herbert Groh, and Mr. W. T. Macoun and others.

ALL ARE WELCOME TO ATTEND THESE EXCURSIONS.

BERTRAM A. FAUVEL, Convener.

Phone, C. 4102, Residence.

Phone, Q. 6300, Local 342, Office.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS

Published by authority of the National Parks of Canada Branch, Department of the Interior, Canada

In the following returns upon banded birds it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Birds Act of Canada and the United States. The great majority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil, or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

RETURNS UPON BIRDS BANDED IN 1927

GLAUCOUS-WINGED GULL, No. 322,901, yg., banded by F. R. Butler, at Bare Island, near Sidney, Vancouver Island, British Columbia, on July 21, 1927, was found dead at Otter Bay, Pender Island, British Columbia, during the month of February, 1928.

GLAUCOUS-WINGED GULL, No. 322,934, yg., banded by F. R. Butler, at Bare Island, near Sidney, Vancouver Island, British Columbia, on July 21, 1927, was recovered at a place near San Juan Island, Puget Sound, Washington,—reported on January 8, 1928.

GREAT BLACK-BACKED GULL, No. 422,-597, banded by R. W. Tufts, at Lake George, Yarmouth County, Nova Scotia, on July 22, 1927, was found dead at Little River Harbour, Yarmouth County, Nova Scotia, on April 20, 1928.

GREAT BLACK-BACKED GULL, No. 423,-042, banded by Basil Colbran, at Lake George, Yarmouth County, Nova Scotia, on July 22, 1927, was found dead 23 miles south of Liverpool, Nova Scotia, on August 11, 1927. The bird had probably been shot.

GREAT BLACK-BACKED GULL, No. 422,-172, juv., banded by Harrison F. Lewis, at Boat Islands, Saguenay County, Quebec, on July 26, 1927, was shot by a resident of Comfort Bight, Labrador, on October 7, 1927.

GREAT BLACK-BACKED GULL, No. 302,-702, juv., banded by Harrison F. Lewis, at Boat Islands, Saguenay County, Quebec, on July 27, 1927, was found dead, "washed up at high water mark," by a resident of Westport, Digby County, Nova Scotia, during the latter part of February, 1928.

HERRING GULL, No. 564,050, banded by William I. Lyon, at Sister Island, Green Bay, Wisconsin, on July 5, 1927, was found dead at Cape Brule, a summer resort on Northumberland Strait, three miles from Shediac and 20 miles from Moncton, Westmoreland County, New Brunswick,—reported on May 28, 1928. Apparently the bird had not been shot.

HERRING GULL, No. 568,707, banded by Harold C. Wilson, at Sister Island, Wisconsin, on July 5, 1927, was shot on the north shore of Lake Erie, one mile east of Kingsville, Ontario, (Essex County), on November 10, 1927.

HERRING GULL, No. 568,803, yg., banded by H. C. Wilson, at Sister Island, Wisconsin, on July 5, 1927, was killed by a resident of Woswonaby, Hudson's Bay Company's Post, via Senneterre, Quebec, about the beginning of October, 1927.

HERRING GULL, No. 564,330, banded by William I. Lyon, at Gravel Island, Wisconsin, on July 6, 1927, was found dead at the Rouge Hills on the shore of Lake Ontario, about 15 miles east of the city of Toronto, Ontario,—reported on October 17, 1927. The bird had apparently been dead for about two days before the body was found.

HERRING GULL, No. 564,717, banded by William I. Lyon, at Little Gull Island, Michigan, on July 7, 1927, was found dead on a marsh on the north shore of Lake Ontario, near Oshawa, Ontario, about October 4, 1927.

HERRING GULL, No. 564,984, banded by William I. Lyon, at Little Gull Island, Delta County, Michigan, on July 7, 1927, was caught in a trap set for mink, by a resident of Mindemoya, Manitoulin Island, Lake Huron, Ontario, on November 6, 1927. The bird was released uninjured and the band removed.

HERRING GULL, No. 564,990, banded by William I. Lyon, at Gravelly, Gull Island, Delta County, Michigan, on July 8, 1927, was killed by an owl on the shore of Daveaux Island, Lake Superior, on November 18, 1927.

HERRING GULL, No. 566,586, banded by William I. Lyon, at Gull Island, Delta County, Michigan, on July 15, 1927, was found dead on the shore of Lake Huron, at Southampton, Ontario, —reported on December 29, 1927.

HERRING GULL, No. 422,125, juv., banded by Harrison F. Lewis, at Eastern St. Mary Island, Saguenay County, Quebec, on July 23, 1927, was found wounded at Cape Bateau, Shippigan Island, Gloucester County, New Brunswick,— reported on June 2, 1928.

HERRING GULL, No. 422,129, juv., banded by Harrison F. Lewis, at Eastern St. Mary Island, Saguenay County, Quebec, on July 23, 1927, was found dead on the Miramichi River, New Brunswick, on October 6, 1927.

RING-BILLED GULL, No. 565,969, banded by William I. Lyon, at St. Martins Island Shoal, Lake Huron, Michigan, on July 12, 1927, was found dead on Hamilton Bay, Lake Ontario, Ontario, on November 30, 1927, approximately. The bird was saturated with oil.

RING-BILLED GULL, No. 497,042, juv., banded by Harrison F. Lewis, at Kégashka River, Saguenay County, Quebec, on August 3, 1927, was shot on the shore off Hou Bay, Prince Edward Island, on September 9 ,1927.

RING-BILLED GULL, No. 497,061, juv., banded by Harrison F. Lewis, at Kégashka River, Saguenay County, Quebec, on August 3, 1927, was found dead on the shore of the St. Lawrence River, at Champlain, Quebec, on September 25, 1927.

RING-BILLED GULL, No. 497,142, juv., banded by Harrison F. Lewis, at Kégashka River, Saguenay County, Quebec, on August 3, 1927, was found on the shore of the river at Buctouche, Kent County, New Brunswick,—reported on October 30, 1927.

RING-BILLED GULL, No. 497,160, juv., banded by Harrison F. Lewis, at Kégashka River, Saguenay County, Quebec, on August 3, 1927, was picked up dead by a resident of Little Harbour, Prince Edward Island, on October 21, 1927. Apparently the bird had been dead some time before it was found.

RING-BILLED GULL, No. 497,167, juv., banded by Harrison F. Lewis, at Kégashka River, Saguenay County, Quebec, on August 3, 1927, was caught on the shore of Bryon Island, Madgalen Islands, Quebec, on September 12, 1927, Evidently the bird had been shot as its wings were broken and it was nearly dead. It was killed immediately.

RING-BILLED GULL, No. 497,179, juv., banded by Harrison F. Lewis, at Kégashka River, Saguenay County, Quebec, on August 3, 1927, was killed by an Indian and reported by a resident of Moisie River, Quebec, 320 miles below Quebec City, on September 24, 1927.

CASPIAN TERN, No. 497,102, juv., banded by Harrison F. Lewis, on Fog Island, Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was found at Buctouche, Kent County, New Brunswick, in a bay which leads into Northumberland Strait, on October 18, 1927.

COMMON TERN, No. 432,992, banded by W. B. Purdy, at Gull Isle, St. Clair Flats, Michigan, on July 17, 1927, was caught in a pound net at Nanticoke, about seven miles east of Port Dover Ontario, on September 6, 1927.

ARCTIC TERN, No. 548,656, between 1 and 5 days old, banded by Oliver L. Austin, Jr., at the Red Islands, Turnevick, Newfoundland Labrador, on July 22, 1927, was found dead on the Greve de Marsilly, near La Rochelle, France, on October 1, 1927. The straight distance from Labrador to the coast of France is about 4,200 miles.

GANNET, No. 313,967, yg., banded by William M. Duval, at Bonaventure Island, Gaspé County, Quebec, on September 10, 1927, was caught at a place off Miscou Island, Gloucester County, New Brunswick, about September 15, 1927. An attempt was made to keep the bird alive, but difficulty was experienced in finding food which it could readily eat and it eventually died.

COMMON CORMORANT, No. 302,904, juv., banded by Harrison F. Lewis, at Lake Island near Cape Whittle, Saguenay County, Quebec, on July 17, 1927, was shot at Magaguadavic Lake, near McAdam, New Brunswick, on November 5, 1927.

COMMON CORMORANT, No. 302,910, juv., banded by Harrison F. Lewis, at Lake Island, near Cape Whittle, Saguenay County, Quebec, on July 17, 1927, was killed at Rocky Point, Prince Edward Island, on November 4, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,901, juv., banded by Harrison .F Lewis, at Cormorant Rocks, Cape Whittle Sanctuary, Saguenay County, Quebec, on July 16, 1927, was caught between New London and Old Lyme, Connecticut,—reported on October 20, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,914, juv., banded by Harrison F. Lewis, at Lake Island, near Cape Whittle, Saguenay County, Quebec, on July 17, 1927, was killed by a resident of New Edinburgh, Digby County, Nova Scotia, —reported on November 1, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,356, juv., banded by Harrison F. Lewis, at Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was killed at Tracadie, Gloucester County, New Brunswick, in the fall of 1927,—reported on December 9, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,454, juv., banded by Harrison F. Lewis, at Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was found shot on the beach of Peconic Bay, opposite National Golf Links, Southampton, Long Island, New York, on October 22, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,464, juv., banded by Harrison F. Lewis, at Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was picked up dead on the shore of Gardiners Bay, at Amagansett, Long Island, New York, on October 23, 1927. The bird had probably been shot.

DOUBLE-CRESTED CORMORANT, No. 302,473, juv., banded by Harrison F. Lewis, at Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was shot at Little Creek, Virginia, on December 4, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,476, juv., banded by Harrison F. Lewis, at Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was shot at Cedar Beach, near the Cedar Island Lighthouse, New York, on October 21, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,481, juv., banded by Harrison F. Lewis, at Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was killed at the southern end of Shippigan Island, Gloucester County, New Brunswick, on October 31, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,493, juv., banded by Harrison F. Lewis, at Fog Island Sanctuary, Saguenay County, Quebec, on August 2, 1927, was shot in Barnegat Bay, New Jersey, on October 24, 1927.

DOUBLE-CRESTED CORMORANT, No. 302,375, juv., banded by Harrison F. Lewis, at Washicoutai, Saguenay County, Quebec, on August 12, 1927, was found dead near High Point, Long Beach Island, New Jersey, on February 11, 1928. The bird had no doubt been dead for at least a month before the body was found.

DOUBLE-CRESTED CORMORANT, No. 302,377, juv., banded by Harrison F. Lewis, at Washicoutai, Saguenay County, Quebec, on August 12, 1927, was caught by a resident of Sagamore, Massachusetts, on October 15, 1927. The bird was released alive, after having its band removed.

MALLARD, No. 420,511, m., banded by Bert Lloyd, at Davidson, Saskatchewan, on August 24, 1927, was shot by a resident of Cymric, Saskatchewan, on November 12, 1927.

MALLARD, No. 420,508, m., banded by Bert Lloyd, at Davidson, Saskatchewan, on August 27, 1927, was killed at Last Mountain Lake, Saskatchewan, on November 12, 1927.

MALLARD, No. 379,940, m., banded by J. A. M. Patrick, at Yorkton, Saskatchewan, on September 1, 1927, was shot on Fish Lake, Martin County, Minnesota,—reported on November 15, 1927.

MALLARD, No. 379,933, banded by J. A. M. Patrick, at Yorkton, Saskatchewan, on September 20, 1927, was shot on Leech Lake, Shingobee Bay, Minnesota, on November 12, 1927.

MALLARD, No. 225,702, ad. f., reared by David H. Bendick, and banded by him at Leduc, Alberta, on September 22, 1927, was killed at a place ten miles south of Corvallis, Oregon, on December 11, 1927.

MALLARD, No. 225,703, ad. f., reared by David H. Bendick, and banded by him at Leduc, Alberta, on September 22, 1927, was shot in the same locality, on September 27, 1927.

MALLARD, No. 225,738, ad. m., reared by David H. Bendick, and banded by him at Leduc, Alberta, on September 22, 1927, was killed in the marsh on the east side of the Mississippi River, at Phoenix, Louisiana, about 40 miles from New Orleans, on November 27, 1927.

MALLARD, No. 421,991, ad. f., reared by David H. Bendick, and banded by him at Leduc, Alberta, on September 22, 1927, was killed at Mud Lake, about 15 miles south of St. Joe, Missouri, on November 1, 1927.

MALLARD, No. 420,517, ad. f., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 4, 1927, was killed at Cottonpool, Louisiana, on November 3, 1927.

MALLARD, No. 420,523, m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 5, 1927, was shot on a pond about four miles southwest of Billings, Missouri, on December 19, 1927.

MALLARD, No. 420,525, juv. m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 5, 1927, was shot about one-half mile from Arbela, Missouri, in the northeastern part of the state, on November 15, 1927.

MALLARD, No. 420,534, juv. f., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 7, 1927, was killed on a rice farm about 14 miles southwest of El Camp, Texas, and 10 miles southeast of Louise, Texas, in the Gulf Coast Country, southern part of Texas, on December 2, 1927.

MALLARD, No. 420,535, ad. m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 7, 1927, was shot at the Horseshoe Lake Club, at Dolbow, St. Charles County, Missouri, on November 27, 1927.

MALLARD, No. 421,926, ad. m., reared by David H. Bendick, and banded by him at Leduc, Alberta, on October 8, 1927, was killed on Pecos River, Crane County, Texas, on January 6, 1928.

MALLARD, No. 421,943, ad. m., reared by David H. Bendick, and banded by him at Leduc, Alberta, on October 8, 1927, was killed by a resident of Livingston, Montana, about December 1, 1927.

MALLARD, No. 421,911, ad. f., reared by David H. Bendick, and banded by him at Leduc, Alberta, on October 12, 1927, was shot at a place near Muskogee, Oklahoma, on November 10, 1927.

MALLARD, No. 421,935, ad. f., reared by David H. Bendick, and banded by him at Leduc, Alberta, on October 12, 1927, was killed at a place near Wapato, Washington, on November 23, 1927.

MALLARD, No. 420,549, juv. f., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 18, 1927, was shot on Crow Creek, six miles north of Gann Valley, Buffalo County, South Dakota;—reported on November 29, 1927.

MALLARD, No. 557,001, juv. m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 20, 1927, was killed on a lake 5 miles north of Miami, Saline County, Missouri, on November 29, 1927.

MALLARD, No. 557,004, ad. f., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 24, 1927, was killed on November 21, 1927,—reported by a resident of Saidora, Illinois.

MALLARD, No. 557,005, juv. m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 25, 1927, was shot two and one-half miles northeast of Turtle Lake, North Dakota, on November 6, 1927.

MALLARD, No. 557,006, juv. m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 25, 1927, was killed at Whitmore, Arkansas, on November 28, 1927.

MALLARD X ENGLISH CALL DUCK, No. 420,527, m., black and white, banded by Bert Lloyd, at Davidson, Ssakatchewan, on August 24, 1927, was shot by a resident of Minneapolis, Minnesota, on November 21, 1927.

MALLARD X ENGLISH CALL DUCK, No. 420,544, m., black and white, banded by Bert Lloyd, at Davidson, Saskatchewan, on August 24, 1927, was killed at a place one and one-half miles south of Le Loup, Kansas, on November 12, 1927.

MALLARD X BLACK DUCK, No. 563,486, raised at Penticton in 1927, banded and liberated by R. M. Robertson, at Penticton, British Columbia, on November 2, 1927, was killed on Wappato Lake, Washington County, Oregon, on December 14 (?), 1927. The bird was reported as a female Mallard.

BLACK DUCK, No. 408,457, juv., banded by Austin Rand, at Wolfville, Nova Scotia, on June 15, 1927, was shot at a place near Wolfville, Nova Scotia, on September 15, 1927.

BLACK DUCK, No. 24,146, banded by R. W. Tufts, at Wolfville, Nova Scotia, on June 28, 1927, was shot on a marsh at Kingsport, Kings County, Nova Scotia, about 10 miles from the place of banding, on December 14, 1927. The bird had red legs.

BLACK DUCK, No. 497,676, banded by A. G. Allen, at Oakdale, Long Island, New York, on July 2, 1927, was killed on Hay Bay, near Napanee, Ontario, on October 10, 1927.

BLACK DUCK, No. 596,521, banded by W. B. Large, at Rochester, New York, on November 17, 1927, was caught in a muskrat trap at Mileage 56, west of Capreol, Ontario, on April 28, 1928.

EUROPEAN WIDGEON, "No. K8052,P. Skovgaard, Viborg, Denmark", f., banded at Husavik, Iceland, on July 2, 1927, was shot at Great Pond, Eastham, Massachusetts, on November 14, 1927.

EUROPEAN WIDGEON, No. 601,079, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on December 15, 1927, was shot at Long Lake, about 18 miles northwest of St. Andrew's Mission, Atikameg, P.O., via Grouard, Alberta, during the month of May, 1928.

SHOVELLER, No. 226,132, banded by Alex. Glennie, at Many Island Lake, Alberta, on July 2, 1927, was killed at a place near Cache slough, California, during the latter part of November, 1927. The bird was reported as a female Pintail.

PINTAIL, No. 365,328, yg., banded by Frank L. Farley, at a place west of Camrose, Alberta, on July 17, 1927, was shot in Floyd County, Texas, on December 7, 1927.

PINTAIL, No. 226,835, banded by Bert Lloyd, at Davidson, Saskatchewan, on October 6, 1927, was killed by a resident of Texarkana, Arkansas, on November 7, 1927.

PINTAIL, No. 226,844, banded by Bert Lloyd, at Davidson, Saskatchewan, on October 6, 1927, was killed at a place near Woodsboro, Texas—reported on November 16, 1927.

PINTAIL, No. 226,848, banded by Bert Loyd, at Davidson, Saskatchewan, on October 6 ,1927, was killed on the Arkansas River, near Webbers Falls, Oklahoma, on November 11, 1927. The bird was reported as a "Widgeon Duck."

LESSER SCAUP DUCK, No. 226,838, juv., banded by Bert Lloyd, at Davidson, Saskatchewan, on August 24, 1927, was shot on Chesapeake Bay, about 2 miles from Hardings Wharf, Virginia, and about one-half mile above Dividing Creek, on December 7, 1927.

GOLDEN-EYE, No. 365,333, yg., banded by Frank L. Farley, at Camrose, Alberta, on June 19, 1927, was killed at Pakan, Alberta, on October 31, 1927.

GOLDEN-EYE, No. 365,364, yg., banded by Frank L. Farley, at Camrose, Alberta, on June 19, 1927, was killed at Crescent Lake, Oregon, on December 11, 1927.

BLACK-CROWNED NIGHT HERON, No. 406,186, banded by George Lang, at Indian Head, Saskatchewan, on June 11, 1927, was found on the shore of one of the lakes in Township 16, Range 13, west of the second meridian, Saskatchewan—reported on June 22, 1928. The band was removed from the bird.

MARSH HAWK, No. 225,985, juv., banded by Edwin Beaupré, at Cataraqui Marsh, near Kingston, Ontario, on June 28, 1927, was killed near Hendersonville, North Carolina—reported on November 14, 1927.

RED-TAILED HAWK, No. 200,641, yg., banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 3, 1927, was captured alive by a resident of Chelsea, Oklahoma, on November 24, 1927.

RED-TAILED HAWK, No. 309,019, yg., banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 3, 1927, was shot by a resident of Brumley, Miller County, Missouri, on November 3, 1927.

GREAT HORNED OWL, No. 465,104, captured at Rosevale, Albert County, New Brunswick, on August 21, 1927, and banded by John B. DeMille, at Camp Herring Cove, Point Wolfe, New Brunswick, on August 22, 1927, was caught,—reported by a resident of Canaan Station, Westmorland County, New Brunswick, on December 3, 1927.

KINGBIRD, No. 425,010, imm., banded by George Lang, at Indian Head, Saskatchewan, on July 18, 1927, was found wounded by a resident of Indian Head, Saskatchewan, on August 7, 1927. The bird may have struck a telephone wire and broken its wing. It died shortly after it was picked up.

STELLER'S JAY, No. 286,777, ad., banded by P. S. Walker, at Vancouver, British Columbia, on September 13, 1927, was found dead in the snow at South Vancouver, British Columbia, on December 8, 1927.

BLACK-HEADED JAY, No. 467,912, banded by T. T. & E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on October 4, 1927, was recaptured several times at the same station on October 4, 5, 7, 8 and 9, and was captured by a resident of Vavenby, British Columbia, on October 24, 1927, when it was reported as a Blue Jay.

CROW, No. 455,560, banded by John Wilkie, at Point Edward, Ontario, on May 21, 1927, was killed in the vicinity of Sarnia, Ontario, on September 18, 1927.

CROW, No. 222,313, yg., banded by J. A. Briggs, at Biggar, Saskatchewan, on June 15, 1927, was shot by a resident of Butte, Nebraska, on October 11, 1927.

CROW, No. 367,867, yg., banded by J. A. Briggs, at Stony Beach, Saskatchewan, on June 28, 1927, was shot at a place twenty-seven miles west of Hutchinson, Kansas, on November 13, 1927.

CROW, No. 367,868, yg., banded by J. A. Briggs, at Stony Beach, Saskatchewan, on June 28, 1927, was killed in the same locality,—reported on August 10, 1927.

CROW, No. 368,154, juv., banded by A. Burton Gresham, at Pelican Lake, near Belmont, Manitoba, on July 5, 1927, was shot at Grenville, South Dakota,—reported on October 18, 1927.

BALTIMORE ORIOLE, No. 424,557, m., three years old, banded by Paul Kuntz, at 140 Luxton Avenue, Winnipeg, Manitoba, on June 5, 1927, was killed by a cat shortly before August 5, 1927,—reported by a resident of 66 St. Cross Street, Winnipeg, Manitoba.

BRONZED GRACKLE, No. 463,189, imm., in nest, banded by W. P. Gerald, at Fredericton, New Brunswick, on June 14, 1927, was caught by a cat, at Fredericton, New Brunswick, on June 19, 1927. The bird was dead.

BRONZED GRACKLE, No. 287,845. ad., caught in an oat bin near Muscow, and banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on August 7, 1927, was killed shortly before May 31, 1928,—reported by a resident of Hayward, South Dakota, No. 845 Lynton, Saskatchewan. The bird was reported as a Red-winged Blackbird.

GAMBEL'S SPARROW, No. 510,301, banded by T. T. & E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on May 18, 1927, was recaptured at the same station on May 18, 1927, and was found dead at the same station on June 12, 1927.

WHITE-THROATED SPARROW, No. 494,-710, ad. f., banded by Ralph E. DeLury, at Ottawa, Ontario, on October 9, 1927, was recaptured at the same station on October 14, 15 and 16, 1927, and was killed by a cat, at the same station on October 17, 1927.

CHIPPING SPARROW, No. 81,454, imm., in nest, banded by W. Philip Gerald, at Fredericton, New Brunswick, on June 11, 1927, was found dead at the same station,—reported on October 1, 1927.

CHIPPING SPARROW, No. 81,455, imm., in nest, banded by W. Philip Gerald, at Fredericton, New Brunswick, on June 11, 1927, was found dead at the same station,—reported on October 1, 1927.

CHIPPING SPARROW, No. 81,456, imm., in nest, banded by W. Philip Gerald, at Fredericton, New Brunswick, on June 11, 1927, was found dead at the same station,—reported on October 1, 1927.

CHIPPING SPARROW, No. 81,457, imm., in nest, banded by W. Philip Gerald, at Fredericton, New Brunswick, on June 11, 1927, was found dead at the same station,—reported on October 1, 1927.

OREGON JUNCO, No. 513,226, ad. m., banded by P. S. Walker, at Vancouver, British Columbia, on November 4, 1927, was killed in a mouse trap, at Vancouver, British Columbia, on January 31, 1928.

SHUFELDT'S JUNCO, No. 573,522, imm., banded by T. T. & E. B. McCabe, at Indianpoint Lake, Barkerville, British Columbia, on September 8, 1927, was recaptured several times at the same station, on September 11, 13, 14, 15 and 16, 1927, and was killed by a hawk in a trap, at the same station, on September 16, 1927.

SONG SPARROW, No. 185,497, juv., banded by Ralph E. DeLury, at Ottawa, Ontario, on July 11, 1927, was killed by a rat, no doubt, in a trap at the same station, on August 6, 1927.

HOUSE WREN, No. B3,466, yg., banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 17, 1927, was found dead in nest at the same station, on August 2, 1927.

ROBIN, No. 506,717, juv., banded by E. H. Fletcher, at Point Edward, Ontario, on May 24, 1927, was found at Port Huron, Michigan,—reported on June 5, 1928. The band was removed from the bird.

ROBIN, No. 399,762, fledgeling, banded by George Lang, at Indian Head, Saskatchewan, on May 29, 1927, was found,—reported by a resident of Moreauville, Avoyells Parish, Louisiana, on January 10, 1928.

ROBIN, No. 506,744, juv., banded by E. H. Fletcher, at Point Edward, Ontario, on June 5, 1927, was killed in Washington County, Georgia, on January 15, 1928.

RETURNS UPON BIRDS BANDED IN 1928

HERRING GULL, No. 223,250, ad., banded by John W. Piggott, at Bridgetown, Nova Scotia, on February 12, 1928, was found dead in a field at Lawrencetown, Nova Scotia, six miles from the place where it was banded, on or about April 16, 1928.

MALLARD, No. 322,944, m., banded by F. R. Butler, at Elk Lake, Victoria, British Columbia, on January 18, 1928, was killed by a "big Horned Owl" at a place a short distance from where it was banded,—reported on February 14, 1928.

MALLARD, No. 322,945, m., banded by F. R. Butler, at Elk Lake, Victoria, British Columbia, on January 18, 1928, was shot at Brentwood, Vancouver Island, British Columbia, on January 27, 1928.

MALLARD, No. 322,947, m., banded by F. R. Butler, at Elk Lake, Victoria, British Columbia, on January 18, 1928, was shot at Brentwood, Vancouver Island, British Columbia, on January 31, 1928.

MALLARD, No. 322,949, f., banded by F. R. Butler, at Elk Lake Game Farm, Victoria, British Columbia, on January 20, 1928, was shot in the Saanich District, Victoria, British Columbia, on January 23, 1928.

MALLARD, No. 420,946 banded by F. W. Robb, at Ellinwood, Kansas, on February 9, 1928, was caught in a rat trap, about 225 miles north of Edmonton, Alberta,—reported on May 15, 1928. The band was removed from the bird.

MALLARD, No. 498,251, m., banded by Clarence E. Chapman, at the Cooper River, Oakley, South Carolina, on February 12, 1928, was found in a trap on May 3, 1928,—reported by a resident of Cedar Lake, Manitoba.

MALLARD, No. 498,313, m., banded by Clarence E. Chapman, at the Cooper River, Oakley, South Carolina, on March 4, 1928, was caught in a muskrat trap on May 14, 1928,—reported by a resident of Meadow Lake, Township 60, Range 16, west of the third meridian, in the northern part of Saskatchewan.

PINTAIL, No. 422,796, f., banded by L. Arnold, at Buena Vista Lake, California, on February 18, 1928, was found dead on Section 12, Township 52, Range 11, west of the third meridian, near Witchekan Lake, Saskatchewan, on May 2, 1928. The bird had evidently been shot.

PINTAIL, No. 540,253, banded by L. Arnold, at Buena Vista Lake, California, on February 18, 1928, was found dead near a slough by a resident of Wilcox, Saskatchewan, on May 13, 1928.

RING-NECKED DUCK, No. 567,737, banded by Charles O. Handley, at Beachton, Grady County, Georgia, on January 29, 1928, had its band removed by a resident of Water Hen River, Reserve, Lake Waterhen, Manitoba,—reported on May 18, 1928.

RING-NECKED DUCK, No. 567,806, banded by C. O. Handley, at Beachton, Grady County, Georgia, on February 6, 1928, was caught and drowned in a muskrat trap on the Sturgeonweir River, about 15 miles northwest of Amisk Lake, Saskatchewan, on May 12, 1928.

COOT, No. 498,629, f., banded by Alfred D. Trempe, at Gustine, California, on February 6, 1928, was found dead near a slough, by a resident of Morinville, Alberta, about June 7, 1928. The bird had apparently been dead for some time.

COOT, No. 498,774, banded by A. D. Trempe, at Gustine, Mercer County, California, on February 10, 1928, was recaptured several times at the same station, and was found dead on a farm in Section 36, Township 26, Range 21, west of the third meridian, 125 miles southwest of Saskatoon, Saskatchewan, on May 3, 1928.

HUNGARIAN PARTRIDGE, No. 363,195, ad., imported from Bohemia, and banded by John W. Piggott, at Bridgetown, Nova Scotia, on March 24, 1928, was found dead at a place one-third mile from where it was liberated, about June 1, 1928.

HUNGARIAN PARTRIDGE, No. 363,204, ad., imported from Bohemia, and banded by John W. Piggott, at Bridgetown, Nova Scotia, on March 24, 1928, was "killed by vermin," two hundred yards from where it was liberated, on May 10, 1928.

BRONZED GRACKLE, No. 529,492, banded by Fred W. Fenety, at Fredericton, New Brunswick, on April 29, 1928, was caught on the Experimental Farm, Fredericton, New Brunswick,—reported on July 14, 1928.

SONG SPARROW, No. B36,721, banded by Fred. W. Fenety, at Fredericton, New Brunswick, on April 24, 1928, was found dead in a building at Fredericton, New Brunswick,—reported on June 11, 1928.

ROBIN, No. 640,370, yg., banded by John Arnaud, at Ste Anne de Bellevue, Quebec, on June 15, 1928, was found dead on the campus of Macdonald College, Quebec—reported on June 26, 1928. The body was much mutilated and decomposed.

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CONTENTS

	PAGE
On a New Pelecypod Calyptogena Gibbera. By C. H. Crickmay	93
Notes on the Birds, Orchids, Ferns and Butterflies of the Province of Quebec, 1928. By Henry Mousley	93
Glimpses of Little-Known Western Lakes and their Bird Life—continued. By J. A. Munro	99
Obituary—George Rivers White. By Hoyes Lloyd and Norman H. H. Lett (With illustration)	103
Land Molluscs of the Abitibi Region. By J. L. Hart	104
Further Observations on Canadian Land and Freshwater-Crustacea, Made in 1928. By Frits Johansen	104
Gumweed (*Grindelia Squarrosa* [Pursh] *Dunal*) in Ontario. By Herbert Groh	106
Bird Census, 1928. By Allan Brooks and Theed Pearse	107
Notes and Observations:	
Wanted—Crows—Dead or Alive!	107
Protection of Moose. By W. F. H. Mason	107
The Spread of the Black Squirrel in the Toronto Region and Victoria County, Ontario. By J. A. Munro	108
The Water Shrew at Scotia Junction, Ontario. By W. E. Saunders	108
An Enemy of the Corn Borer. By J. Roland Brown	108
Great Horned Owl. By R. J. Rutter	108
Jack Miner's Tagged Wild Geese Visit Another Sanctuary. By Manly F. Miner	108
Book Reviews:—	
Birds of Western Canada (Taverner). By H.L.	109
Contributions of the Royal Ontario Museum of Zoology. No. 1. By R.M.A.	109
Contributions of the Royal Ontario Museum of Zoology. No. 2. By R.M.A.	109
Members of Ottawa Field-Naturalists' Club and Subscribers to *The Canadian Field-Naturalist*, May, 1929	110

The official publications of THE OTTAWA FIELD-NATURALISTS' CLUB have been issued since 1879. The first were *The Transactions of the Ottawa Field-Naturalists' Club*, 1879-1886, two volumes; the next, *The Ottawa Naturalist*, 1886-1919, thirty-two volumes; and these have been continued by *The Canadian Field-Naturalist* to date. *The Canadian Field-Naturalist* is issued monthly, except for the months of June, July, and August. Its scope is the publication of the results of original research in all departments of Natural History.

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The Canadian Field-Naturalist

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ON A NEW PELECYPOD CALYPTOGENA GIBBERA

By C. H. CRICKMAY

Calyptogena, a genus of pelecypods of the family Carditidæ is represented in the living Pacific American fauna by *C. pacifica* Dall and *C. elongata* Dall. Species of this genus are not common as fossils. However, an interesting and apparently new form of *Calyptogena* has recently been found by the writer in the lowest beds of the Santa Barbara formation*, so called, on Deadman's Island near the port of San Pedro, California. This new form is to be distinguished from the living type by its outline and proportions:

Length	52 mm.
Height	29 "
Diameter	15 "

Fig. 1. *Calyptogena gibbera* sp. nov., holotype, right lateral aspect, slightly more than natural size.

The new species somewhat resembles *C. elongata* but has a greater height and an arched postumbonal slope, whence the trivial name. All the dimensions, but especially the length, are greater than those of *C. pacifica*.

The fossil occurs only in the second bed above the base of the formation. It is associated with only one other species, namely, *Phacoides acutilineatus* Conrad which is somewhat more numerous than the *Calyptogena*. The valves of both are still together as in life, and, although densely crowded, lie flat with the bedding. They are set in a matrix of hard, grey shale. The bed which contains them is only six inches thick, and is discontinuous, since it appears nowhere but on the west side of the island near its south end. The stratigraphic relation to the beds below and above appears to be perfect accordance.

The chronologic relations are less clear; though it is plain that the bed is not much younger than the stratum below, or much older than that above. These associated beds contain rich faunas, ninety-five per cent of the species of which are still living. So they might well belong to the latest Pliocene or early Pleistocene. The new *Calyptogena* appears to be extinct—a noteworthy circumstance for a form of this late date. Unluckily this species of itself yields no clue as to its exact correlation. But the chief difficulty about the problem of correlation arises out of the persistence of nearly all the main elements of the faunas. So it may that the appreciation and zonal delimitation of those forms, which, like *Calyptogena gibbera*, have a restricted vertical range will prove an aid toward a solution, and this communication has been written for that purpose.

*Named in 1912 by J. P. Smith who considered it latest Pliocene.

NOTES ON THE BIRDS, ORCHIDS, FERNS AND BUTTERFLIES OF THE PROVINCE OF QUEBEC, 1928*

By HENRY MOUSLEY

YES, not once, but many times the spirit moved us—as I suggested it might in the February number of *The Canadian Field-Naturalist* for 1928, p. 29—and in company with congenial spirits, we again sought the abodes of that elusive bird the Woodcock (*Rubicola minor*), and with well-trained batteries

*Read before the Province of Quebec Society for the Protection of Birds, Montreal, Jan. 14, 1929, under the title. "Gleanings of a Naturalist in 1928" (illustrated).

(camera), shot the bird on many occasions, and under varying conditions, but of this anon. Meanwhile, it may not be amiss to draw attention to the three outstanding events—to me at least—of the season of 1928, before they become lost, or may be dwarfed, in a sea of other notes. As regards the first, it may be said to be merely a matter of personal gratification, that of at last seeing a nest and eggs in situ of the Water Thrush (*Seiurus n. noveboracensis*), the other two of scientific interest, since they include the extension of the present known range in the Province of Quebec, of that curious orchid the Broad-leaved Epipactis (*Amesia latifolia*), from Chambly to Cassville, near Hatley, in Stanstead County, a matter of some sixty miles in a south-easterly direction, whilst, in a northerly direction, the range of the little Lance-leaved Grape Fern (*Botrychium angustisegmentum*)—curiously enough—has been extended about the same distance, and from Chambly also, to St. Hippolyte in the Laurentian mountains.

Before proceeding, however, to describe these events in their proper sequence, I am reminded of yet one other outstanding event, that of seeing a Hawk Owl (*Surnia ulula caparoch*)—at very close quarters—on Ile Bizard on May 5, and wondering what he or she might be doing in these parts—at such a date.

The first outing of the season to Adirondack Junction on April 21, resulted in a blank, followed however, the day after, near St. Lambert—thanks to Mr. Terrill—by the sight of a nest and eggs of the Woodcock (*Rubicola minor*), the first for the season, as well as a nest of the Prairie Horned Lark (*Otocoris alpestris praticola*) with characteristic paving—stone chippings in this instance—the young having already left. A Migrant Shrike's (*Lanius ludovicianus migrans*) nest was also seen. The first Killdeer's (*Oxyechus vociferus*) nest with four eggs was found on May 4 near Verdun, followed the day after by two others on Ile Blizard, containing sets of 3 and 4 eggs respectively. Inexperienced persons no doubt imagine the finding of these nests to be an easy matter, the noisy birds giving a clue to the site. Following up a pair of noisy birds, however, does not necessarily lead to results, notwithstanding the fact that they are probably flying over, or near, the nesting ground. Other tactics have to be employed, and even when these are known, success may not always follow at once, so beautifully camouflaged are the eggs at times. On this very day for instance, Mr. Napier Smith was showing our guest, Mr. Rex Meredith of Quebec, a "scrape" or "false" nest, and remarking it was curious we could not locate an occupied one near it, since the actions of a pair of birds certainly led us to believe there must be one. It was not until after lunch, and my companions had left me for a time, that I became convinced—from the renewed actions of the birds—that there surely must be a nest, and that not very far off either. Imagine my surprise on walking towards one of the birds, to step almost on the nest, only a few yards away from the "false" one—already pointed out to our guest. So beautifully had the colour and markings of the eggs blended with their natural surroundings, that none of us had noticed it. Another interesting find, was that of a Robins' nest (*Planesticus m. migratorious*) situated at the foot of a small willow in a marshy field, the nest almost resting on the ground, certainly an unusual position. It was on this same day also, that we had the first thrill of the season, the Hawk Owl (*Surnia ulula caparoch*)—already referred to—frequenting the vicinity for some considerable time, and affording us many excellent views. On one occasion, it perched in a small tree at the side of the road, allowing two motor cars and some foot passengers to pass by, as well as ourselves to photograph it—with a 20″ lens—before flying away, thereby confirming its well known character, that of being one of the least shy of our native owls. For an interesting account of the undoubted breeding of this species at Lochaber, P.Q., in May, 1915, I might mention Mr. Napier Smith's article in the April number of *The Canadian Field-Naturalist* for 1922.

The day following (May 6), will ever remain a memorable one I imagine for the eight or nine persons taking part in it, most of whom had never seen a Woodcock's nest and eggs, let alone what the bird will stand before deserting its home, which even to the "old hands", was a revelation on this occasion. To begin with, most, if not all of us, had cameras, including large reflex ones, which are not always the most silent of machines and yet for the space of probably an hour that bird never blinked an eye, whilst the gunners rained shots innumerable on its devoted head, as it sat in the nest covering its four eggs. Apparently, I was the only one who carried a tripod or at least used one, for there is a photo extant which shows me just two feet away from the nest, looking down on the bird from behind a black hood, a most terrifying object, but even this apparition failed to startle it, the title on the back of the photograph reading: "Henry Mousley in action, Heaven help the Woodcock!" My own pictures shew members of the party stroking the bird as it sat in the nest, and what it allowed us to do is almost incredible. Even now, I see it all again as if it was but yesterday, each of us reeling

off film packs in an endeavour to get as many different pictures as possible, before the bird should take its sudden departure. There are other sides to this adventure, but these must follow in their due sequence. In the meantime, before the day was out, three other nests were either found or visited, two of which contained eggs, causing further expenditure of ammunition, till at last exhausted, we gathered round an ample fire and regaled ourselves with baked beans, and other good things, until such time as Woodcock père decided it was time to do his serenading. This commenced at 7.30 p.m. standard time, the first ascent taking place seven minutes later, after the bird had uttered 45 of the *"peent"* notes on the ground. Two other ascents were made, one after a series of 56 *"peent"* notes, and the other after 16 of these curious notes had been uttered, the light at the time being good, owing to an almost full moon. During these performances a Wilson's Snipe (*Gallinago delicata*) was drumming also in the immediate neighbourhood, a fitting climax to a day of thrills.

May the 8th—the opening field day of the Province of Quebec Society for the Protection of Birds—found us with a number of the members again listening to the love song of the Woodcock, near St. Lambert. On this occasion, two birds were performing, with a Wilson's Snipe again drumming in the distance. The first *"peent"* notes of one of the birds commeneed at 7.35 p.m. standard time, and were uttered 105 times before the bird ascended, the moon now being in its last quarter, but the light still quite good. Three other ascents were witnessed after the bird had uttered the *"peent"* notes 25, 75 and 32 times, respectively. The day following—the 9th—saw Mr. Smith and myself once more at the nest of the devoted Woodcock, and lucky we were, for its behaviour on this occasion was totally unlike that of the previous visit—and for the moment surprised us—for even before we had our cameras ready, it arose and left the nest, acting the broken-wing trick. At once we guessed what had happened, with visions no doubt of picturing young birds, and perhaps of even obtaining a super picture, that of the old bird transporting its young to a place of safety. Certainly, had our cameras been in action, we might at least have obtained pictures of the parent acting the broken-wing trick, but by the time we were ready, it was some way off, and a nearer approach resulted only in its taking to flight, and so putting an end to the "what might have been". On turning our attention to the nest, we found that as yet, only one young bird had hatched out, so making sure of his or her picture, as the case might be, we left the spot, returning, however, in about an hour's time, only to find the young bird gone, and our chance no doubt of a super-picture gone as well, for I feel convinced the old bird transported the youngster away, it being too weak—from its behaviour in the nest—to have followed its parent for any distance, and this view was further confirmed by the fact of our failing to find traces of either within a wide radius of the nest. At this juncture, an interesting problem crops up. Did some heredity faculty—as has been suggested in the case of other birds—warn the parent that the remaining eggs were infertile—as we afterwards found them to be—or were the terrible experiences of the few days previous, coupled with our present visit a contributing factor in influencing the parent to make off with the one chick while there was yet time? This we shall never know for certain, but what we do know is, that in a similar case with one of our other woodcocks, Mr. Terrill being the lucky one on that occasoin to arrive just as a chick emerged which, after having photographed, he left, returning later in the afternoon to find the other three out of their shells, and all four young then in the nest. In this case, as in the previous one, the old bird had been photographed many times, some of the pictures—as before—depicting our stroking it on the nest, and yet it did not transport the one chick away for good, but returned to hatch out the three remaining eggs. It has been said that a great part of the unique charm of birds, lies in their incurable individualism, a statement in which I thoroughly concur for how monotonous would it be, if, in our field studies, we found all birds to act alike. To my mind, the charm in studying bird and plant life in the open is, that we learn to what extent if any, deviation takes place from the general principles laid down in our text books, governing the conduct of most birds and plants. How few, alas, know anything definite regarding such deviations either one way or the other, matters that can be learned only by long and patient study in the field. Without the knowledge, the layman no doubt is apt to look upon the above principles as irrefutable gospel.

Speaking generally, most birds, especially warblers, have one or two favourite positions for sitting in their nests, and this practice would seem to apply to woodcocks also, judging from the numerous photographs taken at various times, all of which seem to point to each individual bird having not more than two favourite positions for sitting in the nest, one of which—strange to say—may even prevent a quick "get-away" in case of danger. This was well exemplified on the 12th

when Mr. Smith and myself took several photographs of a bird at various times of the day, and when returning later, found it facing in quite a different direction, in once case, facing west at 10.30 a.m., and north at 2.30 p.m., these two photographs being especially interesting as shewing both the easy and the more difficult "get away". The 13th saw us at St. Rose, where interesting pictures were taken of two Killdeer's nets, one beautifully camouflaged amidst a quantity of loose stones, as well as one of young Prairie Horned Larks, also affording a good example of the same thing. Of the birds observed the most interesting were four Greater Yellowlegs (*Totanus melanoleucos*), and one Pipit (*Anthus rubescens*). Four days later, or the 17th May, saw us again on Ile Blizard, when another nest of the Killdeer was found, one of the Bronzed Grackle (*Quiscalus quiscula œncus*), as well as several Robins and Song Sparrows (*Melospiza m. melodia*), one of the latter containing four Cowbird's (*Molothrus a. ater*) eggs. This reminds me of our having found four nests in a wood at Brosseau in 1927, each containing a Cowbird's egg evidently laid by the same female, which like that of the European Cuckoo, may select the breeding area or territory, and not the male. Even supposing the latter to have done so—as is general in the case of most birds—then the present case affords a good example of the truth of my theory that, whereas the male bird wins for himself the right to a certain territory, yet with the female rests the choice of the precise situation of the nest on that territory, see my paper, "Which Sex Selects the Nesting Locality," *Auk*, vol. XXXVIII, 1921, pp. 321-28. The species imposed upon on this occasion were the White-throated Sparrow (*Zonotrichia albicollis*), Ovenbird (*Seiurus aurocapillus*), and in two instances the Black and White Warbler (*Mniotilla varia*). The number of eggs in a set is not definitely known, but usually only one egg is deposited in each nest, the number of species imposed upon by the Cowbird considerably exceeding one hundred.

On the 20th I was out with Mr. Terrill near St Lambert, in the hope of finding the four young woodcocks—he had photographed the night before at 6 p.m., and which I have already alluded to—still in the nest. But no such luck, they had all vanished, and persistent searching over a wide area around the nest produced no results. A nest of the Marsh Hawk (*Circus hudsonius*) containing four young birds was found in almost the same spot as the one of 1926, while a hole in a telegraph pole at the side of the railway line contained four fresh eggs of the Sparrow Hawk (*Falco s. sparverius*). Forty-eight species of birds were observed, amongst which were thirteen different kinds of warblers, almost all of which were in one little wood. A few days later, or the 24th, we were at Chambly, where sixty-five species of birds were noted, there being on this occasion seventeen different kinds of warblers. Amongst the orchids, the little Ram's Head Lady's Slipper (*Cypripedium arietinum*) was in bud only, and of the smaller ferns the Branching Grape Fern (*Botrychium ramosum*) was just unfurling its fronds. The early Round-leaved Violet (*Viola rotundifolia*) was all but over. If I remember rightly, the morning of the 27th broke cold and cheerless, but nevertheless Mr. Smith and myself started off for St. Francois de Sales, where the year previous a nest of the Water Thrush (*Seuirus n. novaboracensis*) had been found, containing four young birds and one egg, as already mentioned in the February issue of *The Canadian Field-Naturalist* for 1928. Although I was very familiar with the species at Hatley, and had handled young just out of the nest, I had never actually found a nest containing a set of fresh eggs, their breeding haunts on the shore of Lake Massawippi being too awful for words, and very difficult to work successfully. Here, however, in 1927, things had been different and the site had then presented no very great obstacles, so we set off with high hopes of a red-letter day. A red-letter day it certainly was, but in more senses than one, as you will presently see. To begin with—as already mentioned—the morning had broken cold and cheerless, and without any thought having been given by us to the very wet spring it had so far been, so that when we arrived on the ground, we had the curious sensation of feeling that somehow or other we had mistaken our bearings, for what met our gaze, was not the somewhat swampy wood of 1927, but a large expanse of water, out of which the trees—in a curious kind of way—seemed to be growing, with every here and there mounds of earth at their base. No sound of the exhilarating notes of the Water Thrush reached our ears, but having satisfied ourselves that we were really on the right ground, we commenced our search for the nest in a drizzle of rain, which had now set in, as if to further dampen our already depressed spirits. These, however, were somewhat buoyed up later on, by hearing the notes of the male bird, although not rendered at their full strength. For two long hours we waded about in never less than one foot of water, carefully examining the tops and sides of those mounds wherever the depth of the water allowed, before success crowned our efforts. This happened on almost the last beat in the

extreme corner of the wood, my friend being a little to the left of me, when suddenly he called out, I have it; he was looking directly at the female as she sat in her nest in a crevice between a dead stump and a living basswood tree, the mound on which it was situated being only a few feet above the water level. By this time, it was raining fast, with little hopes of it ever clearing sufficiently to allow of photography being taken. However, we decided to have lunch trusting it might clear up later on. For nearly two solid hours we sheltered under a basswood tree—the best cover available—very wet and miserable, and had about decided to pack up and leave for home when, suddenly, and almost without warning, the sun burst through the clouds and afforded us two perfect hours of sunshine, during which we secured many lovely pictures of the nest and set of five fresh eggs, as well as some of the sitting female, which was a difficult matter owing to the nest being so deeply hidden from view. The behaviour of the female during these operations came as a great surprise, in view of my experience of the home-life of a nearly related species, the Ovenbird, as recorded in the *Auk* for April, 1926, pp. 190-96. In that instance, both parents exhibited extreme nervousness, and I had much difficulty in recording their everyday movements, but here, the female—at all events—shewed very little concern, coming back each time to the nest directly we retired to some distance. Circumstances prevented my making a study of their home life, but I shall hope to do so next year, should they return to the old spot, for the behaviour of the female was certainly the reverse of what one would expect, the bird having been described as out and away the shyest warbler of the north woods. Large clusters of the Showy Orchis (*Orchis spectabilis*) were just coming into bloom, the Yellow Lady's Slipper (*Cypripedium parviflorum* var. *pubescens*) being in bud only. On the 30th of the month, at Verdun, Yellow Warblers (*Dendroica æ. æstiva*) were just commencing to build, whilst several nests of the Red-winged Blackbird (*Agelaius p. phœniceus*) were found in bushes. It is becoming quite a habit here for these birds to forsake the cat-tail beds, and to build their nests in bushes or small trees, suspending them from the twigs and branch branches, somewhat after the manner of a Baltimore Oriole (*Icterus galbula*). The week end of June 2-3, I spent with Mr. T. B. Macaulay at Mt. Victoria Farm, Hudson Heights, P.Q., my bird census for the two days consisting of sixty-two species, amongst the most interesting being a male Scarlet Tanager (*Piranga erythromelas*), and Indigo Bunting (*Passerina cyanea*). Of the twelve species of warblers noted, Black-polls (*Dendroica striata*) were the most abundant, a big wave evidently being on, for I saw hundreds of them on their way to the breeding grounds in the far north. The few Pine Warblers (*Dendroica vigorsi*) about, were evidently breeding, as I found a nest and young in 1927, as already described in my notes for that year. Incidentally, I was fortunate in obtaining several nice photographs of a small herd of Wapiti or American Elk —imported from Wyoming—which are to be found roaming over a portion of the estate enclosed within a high wire fence to prevent their wandering away. Our Elk is a close relation of the European stag. It is the handsomest and next to the Moose the largest member of the deer family in America, and like the Buffalo seems equally at home in the forested region as on the open plains, its range extending from sea level to above timber line on lofty mountain ranges. Exterminated throughout most of their original range they have more or less regained their place in our fauna and are said to be common in the Tonquin Valley, and some other parts of Jasper Park.

Mosquitoes about this time were something terrible, making the photographing of the little Ram's Head Lady's Slipper, and the Striped Coral Root (*Corallorrhiza striata*), near Terrebonne, on the 10th a veritable torture. On the 17th, I visited Chambly, and had an interesting day trying to locate a nest of the Mourning Warbler (*Opornis philadelphia*) on the same ground I had seen a pair of birds in 1927. The male was again in evidence, and singing, but no signs of the female or a nest could be found, the ground being covered with old slashings and difficult to work systematically. The little Ram's Head Lady's Slipper was over, its anthesis being always of very short duration, usually not more than a week. Of the smaller ferns—belonging to the Botrychium group—the Little Grape-Fern (*Botrychium simplex*) and the Branching Grape-Fern (*B. ramosum*) were in full evidence, and I was somewhat surprised to find examples also of the Lance-leaved or Narrow Grape-Fern (*B. angustisegmentum*), an early date for this species I should imagine, as it lasts well into October, long after the other two have ceased to exist. Amongst the butterflies, examples of the large Tiger Swallow-tail (*Papilio glaucus canadensis*), Viceroy (*Basilarchia archippus*), Silver-bordered Fritillary, (*Brenthis myrina*), and large Silver-spotted Skipper (*Epargyrens tityrus*) observed, all the specimens apparently freshly were emerged. Later in the season an interesting specimen of the Black Swallow-tail (*Papilio polyxenes*) was taken by Mr. Campbell Jr., near Como, in

which the spots on the forewings are of a light cream colour, whilst those on the hind wings are normal or yellow, the aberration apparently being due to the scales of the forewings being imperfectly developed and curled up. This specimen is now in the collection of McGill University in the Lyman Entomological room.

On the 23rd, I visited the site on Mount Royal of the Little Grape-Fern, only to find a new road occupying the best station. Persistent searching over a wide area produced four small specimens only, so I presume it is going the way of most things on this mountain. Better luck attended me on the 28th, however, as I obtained a fine series of the Branching Grape-Fern near St. Lambert, the plants being especially fine, with sori on the sterile fronds, and extra fruiting spikes on this portion of the plants as well. The last day of the month (June 30), found me at Dufferin Heights, in Stanstead County, the guest of Colonel and Mrs. Morrill, the former of whom was anxious to shew me a fine station he had discovered—a few days previously—for the white form of the Pink Lady's Slipper (*Cypripedium acaula* var. *albiflorum*). In the evening it was suggested to motor to a lovely spot known as the Gulf Road near Cassville, where all the three large Osmunda Ferns, as well as the Ostrich Fern (*Onoclea Struthipoteris*)—that noblest of our native ferns in my estimation—grew in great profusion, reaching to one's shoulders and over in some cases. A delightful little trout stream meandered through the gulf, the woods rising abruptly on either side, the intention being that I should explore these latter, while the Colonel fished the stream. Hardly had I commenced to climb the right hand bank before coming on some magnificent clusters of the Showy Orchis (*Orchis spectabilis*)—in fruit of course unfortunately—some plants of which reached a height of nearly eleven inches, the extreme given in Gray's Manual being seven inches only! Glancing upwards after having gathered two of these record plants, what should I see? Not the Long-bracted Orchis (*Habenaria viridis* var. *bracteata*) as imagined in the first hurried glance, but a plant of the Broad-leaved Epipactis (*Amesia latifolia*) or Serapias Helleborine as the 7th edition of Gray's New Manual of Botany has it. And thus, notwithstanding years of careful searching, whilst residing at Hatley—which was only some ten or twelve miles distant—I had suddenly come upon this species in the most unexpected manner, but fair to remark, in a district I had never before been in. By this lucky find—as already mentioned—the range of the species in the Province has been extended some sixty miles or more in a south-easterly direction. It was now getting dusk, and further search had to be abandoned for the time being, but not before I had located a few more small plants. The day following (July 1), was spent in visiting the large colony of the white form of the Pink Lady's Slipper, a sight well worth the ride over somewhat rough roads to the low lying cedar swamp in which they were growing, not as odd ones, here and there—as is usually the case—but literally in dozens, in some cases two or three being often close together. Only once previously have I seen anything like it, and curiously enough it was not so very many miles away from the present site—which was near Barnston. A few plants of the Smaller Yellow Lady's Slipper (*Cypripedium parviflorum*), Heart-leaved Twayblade (*Listera cordata*), and Small Northern Bog Orchis (*Habenaria obtusata*), were noted amongst other things. Early the next morning (July 2), saw me again in the Gulf Road, where I located thirty plants of the Broad-leaved Epipactis, mostly small ones, however, and all showing signs of not having been established very many years. Above these, and almost at the top of the bank, was a fine colony of the Large Round-leaved Orchis (*Habenaria orbiculata* and *H. macrophylla*). Descending to the stream once more, I had a good view of a male Mourning Warbler, a bird uncommon in these parts, and one which I had never seen before at Hatley at this time of the year, the present one no doubt having a nest in the immediate neighbourhood. In the afternoon I visited Ayer's Cliff, on my way home to Montreal, obtaining fine series of the Onondaga Moonwort fern (*Botrychium onondagense*), Little Grape-Fern (*B. simplex*), and Branching Grape-Fern (*B. ramosum*), as well as watching a male Purple Martin (*Progne s. subis*) resting on a wire close to its nest in a little Martin house, an unusual sight during my residence in these parts, when Martins were very scarce Now, however, I am glad to say, there seem prospects of their becoming established in the district, for in addition to this pair, I heard of several others having occupied a large Martin house at Beebe, some ten or twelve miles away. My bird census for the visit consisted of forty-six species, of which the most interesting were certainly the Mourning Warbler, and Purple Martin already referred to.

If any proof were wanting that the Large Purple Fringed Orchis (*Habenaria fimbriata*) blooms as a rule earlier than the smaller species, it was forthcoming this season, for on visiting Chambly on the 7th (July), I was fortunate, not only to find the typical form in perfect flower, but also two plants with snow-white blooms (var. *albi-*

flora), the smaller species (*H. psycodes*) being little in evidence, although in full bloom three weeks later. On the 15th, I paid a visit to St. Francois de Sales, finding a new station for that curious little fern the Adder's Tongue (*Ophioglossum vulgatum*), which is by no means common in these parts, there being only one or two other stations I know of around Montreal. None of the plants bore fruiting spikes, the colony to all appearances not having long been formed. Other interesting finds consisted of several snow-white plants (var. *monotropoides*) of the Broad-leaved Epipactis, with one example of the White Adder's Mouth having two leaves (*Malaxis brachypoda forma bifolia*). From the 19th-23rd, I was in the Laurentian Mountains near St. Hippolyte, where almost on arrival, I was fortunate enough to locate a small colony of the rare little Narrow Grape-Fern (*Botrychium angustisegmentum*), thus extending its range in the Province some sixty miles or more north of Chambly, the station where it was discovered last year (1927)—as already mentioned. Amongst other interesting things I came across, was an almost record plant of the little Adder's Tongue fern (*Ophioglossum vulgatum*), on the ground where I discovered it last year, its height being 39 cm., the extreme given in Gray's Manual being 42 cm. A few of the plants of the Broad-leaved Epipactis (var. *monotropoides*) discovered last year, were again in evidence, and I was fortunate also, in locating six more examples of the Green Adder's Mouth with two leaves (*Malaxis unifolia* var. *bifolia*), three of which were especially interesting, a parent plant with two offspring growing alongside—from bulbils—each with two leaves, the first case of its kind to come under my notice. These, and the example of the White Adder's Mouth with two leaves—already mentioned—will be found described and figured in the *Orchid Review* for 1929.

My bird census consisted of thirty-two species, none of which, however, calls for any special notice.

July 29th, found me again at St. Francois de Sales, where I came across an additional station —to that discovered on the 15th inst.—for the white form of the Broad-leaved Epipactis a description of which with illustrations, will also be found in the *Orchid Review* for 1929.

Six days later, or on August 4, I found the Small Purple Fringed Orchis (*Habenaria psycodes*) fully out at Chambly, the larger species (*H. fimbriata*) having flowered some three weeks earlier, as already mentioned. This visit practically ended my collecting activities for the season with one exception, that of a visit to Brosseau with Mr. Terrill on October 6, when he shewed me a little station he had lately discovered for the Narrow Grape-Fern (*Botrychium angustisegmentum*), as well as one for the Oblique and Cut-leaved Grape Ferns (*Botrychium obliquum* and *B. dissectum*). The plants of the last named were especially fine, with large fruiting panicles, putting me in mind of some interesting papers which appeared in the pages of the *American Fern Journal* for 1924, in which various members expressed their views on the subject of *B. dissectum* being a sterile mutant from *B. obliquum* to which I added my quota in the Oct.-Dec. issue, pp. 110-14, basing my views on five years' intensive study in the field, of both *B. obliquum* and *B. dissectum*, from which I could see no reason for assuming that the latter was a sterile mutant from the former, probably only a laciniated form of it. This view was further strengthened in the present instance, many of the plants bearing fine fruiting panicles—as already remarked. In one instance, the roots of both *B. obliquum* and *B. dissectum* were so interlocked, that they appeared to be growing from one rootstock, as was the case with two plants I found at Hatley in 1920, and which I referred to in the above paper. In both cases —it may be worth mentioning—there was no fruiting frond to either of the plants, and in the present instance it may even yet be possible that both plants are actually from one rootstock, as I did not attempt to separate them at the time.

And so ended a memorable season, perhaps the most memorable in a number of years, and at that I will leave it, in the hope of others yet to come.

GLIMPSES OF LITTLE-KNOWN WESTERN LAKES AND THEIR BIRD LIFE

By J. A. MUNRO

(*Continued from Page 74*)

LLOYD LAKE, ALBERTA

From Pakowki Lake we drove to Lloyd Lake, sixteen miles south-west of Calgary, camping, en route at Henderson Lake near Lethbridge, and at High River. The ninety-two miles between Pakowki Lake and Lethbridge proved uninteresting. Only three raptores were seen during the day, an adult Red-tail on the cross bar of a tele-

phone pole, a Ferruginous Rough-leg standing motionless on top of a grassy knoll in clear detail against the sky line, and a Prairie Falcon that came hurtling down the trail towards us, to tower when a scant twenty yards intervened. At High River was seen the first Boreal Flicker and here, also, Robins were noted.

Between Lethbridge and McLeod the country seemed relatively birdless, but there we saw the first flock of crows since reaching the bald prairie. In the wooded river bottom near McLeod a Sparrow Hawk was seen and a Red-tail heard. From McLeod northward the landscape was less monotonous, and prosperous-looking *green* farms became a feature of the landscape. Also we were within sight of the foothills, somewhat dimmed by smoke haze but, nevertheless, welcome to prairie-tired eyes. Longspurs and Shore Larks turned up again but not commonly—none was seen between Lethbridge and McLeod. Near Nanton we stopped the car to watch, from a distance of fifty feet, a soft-eyed Upland Plover on top of a fence post.

Lloyd Lake proved to be lower than had been the case for some years, covering only about one section of land. The maximum depth is approximately seven feet—the water muddy and slightly alkaline. There is no inlet or outlet. In the centre of the lake near the east end are several acres of bog-rush and along the greater part of the shore a matted growth of sago pondweed, forty yards in width in some places, carried a heavy crop of seeds. The shore is gravelly at highwater mark; below this the usual sticky gumbo prevails. A small section of the south and west shore line is sharply defined by banks of eroded limestone, five to twenty feet in height with poplars of tree size and willows and rose bushes covering the tops. Growth of this kind also covers the low hills farther inland.

Bird-life on the lake was abundant. A breeding colony of sixty pairs (estimated) of Eared Grebe occupied a bay on the east shore. The nests, built close together over an area approximately 50 x 100 yards, were composed entirely of sago pondweed and rested on the dense growth of the same plant which filled this portion of the lake. As we approached the colony the sitting birds stood up on the nests and carefully and deliberately covered the eggs—their flashing white underparts contrasting oddly with the swimming bird close by, which, in the strong sunlight appeared nearly black. Farther out on the lake a similar number of Eared Grebe, no doubt the mates of the incubating birds, were congregated. Black Terns attended to the feeding of their young now nearly full grown and active on the wing. As we paddled through the thin growth of tall bog-rush in the centre of the lake a flock of about two hundred, adults and young, circled over us, while other younger birds not so strong on the wing rested on what slight foothold was afforded by the stiff stalks of the old rushes which had broken off close to the water. Broods of pond ducks in all stages, from that of a few days old (Shoveller) to those nearly full grown (Pintail) skittered over the water ahead of the advancing canoe. I was informed that most of these ducks had nested on the dry hillsides often a mile or a mile and a half from the lake. A flock of Redhead (one hundred estimated) and a few White-winged Scoters also were noted. Other species seen were Bartram's Sandpiper, Western Willet, Solitary Sandpiper, Killdeer, Spotted Sandpiper, Lesser Yellow-legs, Rusty Blackbird, Cedar Waxwing and Savannah Sparrow.

Mr. Dan Patton of Midnapore informed me that shooting on this lake is fair and very often continuous until late in the season after the northern lakes have frozen. The south-east corner of the fractional N.E. ¼ of Section 14-22-2-W.5.M., containing about one acre of land, forms the apex of a narrow point partially timbered and with rocky shores where boats may easily be launched. Access is given to this portion by a road allowance. This is said to be the best stand on the lake for flight shooting.

MANITO LAKE, SASKATCHEWAN

Manito Lake, whose area of more than forty square miles includes several islands of interest to the naturalist, is situated close to the Saskatchewan-Alberta boundary and may be viewed in part from the main line of the Canadian National Railway which follows its southern shore for some distance. This is one of the so-called "soda lakes" and so far as observed no fish, molluscs, crustaceans, or vascaulr plants inhabit its waters. Nevertheless it has a large nesting population of Pelicans, California Gulls and Double-crested Cormorants; the attraction for such birds being the small stony islands where the period of incubation may be passed in security from predatory animals. These islands are close to the shore of either the mainland or a large wooded island in the southern part of the lake, and, should the lake level continue to fall as it has done in the past, will eventually become peninsulas. In this event it is highly probable that the nesting colonies will be deserted.

During the month of June, 1921, several days were spent in this region and observations on its topography and bird-life are presented in the following notes.

The south shore of the lake was reached by car from Winter, Saskatchewan, the trail leading through the Manito Forest Reserve—rolling, sandy country well wooded with poplar. The soil through this district is light and sandy and said to be useless for agriculture. It was anticipated that at Yonkers, a station on the Canadian National Railway close to the lake shore, a boat might be obtained in which to visit the islands but this proved a vain hope, for the only boat had been frozen into the ice, and later dismantled, during the previous winter. But the map showed two long peninsulas extending north into the lake and terminating only a short distance from a wooded island of considerable size which blocked further view to the north. So, in the hope of finding some means of crossing the intervening channel, a course was taken towards the longer of the two, known as Point Number One, first by car, over sand flats and through swampy meadows until the last vestige of trail disappeared about five miles out of Yonkers, and thence on foot. Approaching the lake, through a belt of willow and poplar brush and over a wide grass-covered flat, it was seen that the water had receded considerably from the conspicuous high water mark leaving exposed a wide margin of beach—clean sand for the most part with occasional areas of loose boulders. From this view point it was apparent that the peninsula, before the lake receded, had been an island separated from the mainland by a shallow channel several hundred yards wide. Now, the connecting link of exposed lake bottom is fifty yards across and from its northern end the land rises gradually reaching a height of two hundred feet or more at the extreme end of the point; there to drop almost sheer to the lake below. The soil on this former island is of the same sandy nature as that of the mainland and supports a vegetation of short grass with patches of brush in the declivities. From the cliff's edge I looked north across the channel to the island of my destination but a survey of the beach on either side of the point revealed no boat or raft that could be used as ferry, so the trip was abandoned for the time being

Here land birds were not abundant; a few Western Meadowlarks, Baird's Sparrows, Vesper Sparrows and Savannah Sparrows flushed as we crossed the grasslands; in the brush were nesting Crows, several Yellow-throats and one Willow Thrush; from the lake shore came the familiar *radika, radika, radika* of the Marbled Godwit and the mellower whistle of Western Willets. Off shore large bands of White-winged Scoters rested on the quiet water; a few Horned Grebe, Pelicans and Double-crested Cormorants seemed always in evidence while overhead circled California Gulls and a large gathering of Franklin's Gulls.

Between Yonkers station and the lake shore is a wide flat—where the prevailing vegetation of short, coarse grass is interrupted by bare patches of sun-baked earth covered with an alkaline efflorescence—through which a sluggish stream, Eyehill Creek, finds its way to the lake. Here and along the lake shore, on the evening of June 21st, a mighty company of Franklin's Gulls assembled. The beach for perhaps half a mile on either side of the creek was carpeted with gulls. As one approached the water's edge whole battalions rose from the sands to fly inland a short distance, circle back overhead and drop to the beach again. When hundreds of birds had thus risen there appeared no appreciable diminution in the size of the flock on the beach. A local plague of migratory locusts was at its height and this, no doubt, was the reason for the gathering.

After sunset came a few Pintail, Mallard and Shoveller, perhaps from some distant inland slough, and settled on the beach. These were the only surface-feeding ducks seen on Manito Lake.

Topographically the north end of the lake, which was visited on June 23rd, via car from Artland, proved to be similar to the south end. The beaches, of fine yellow sand, are more attractive and a summer resort has been developed. On one such beach were many California Gulls walking slowly along the water's edge and evidently obtaining some food from amongst the debris washed up the previous night during a violent wind storm. These gulls drank from a small stream which entered the lake at this point, evidently preferring fresh water to the strongly saline water of the lake. It was discovered later that these particular gulls belonged to a breeding colony on Island Number One, which was visited by gas-boat on the same day.

Island Number One, situated close to the west shore of the lake from which it is divided by a shallow channel, is about 15 acres in extent. The most prominent topographical feature is a grass-covered, pyramid-shaped hill about one hundred feet in height rising abruptly from the south-east corner of the island. The east side of this hill drops sheer to the beach below, while the west side is a gradual slope. The remainder of the island has a mean elevation of five feet and is composed of sand and coarse gravel, the interior portion being covered with wiry grass and low brush. Should the lake continue to recede undoubtedly this island will become a peninsula similar in all respects to Point Number One previously described.

At one time, according to report, a large colony of Pelicans was located here but because of persecution—the human summer colony on the mainland objected to the smell—were driven off several years previous to my visit. The only species which continued nesting on the island were California Gulls, the colony being estimated at 700 pairs of adults in 1921. In the great flock that came out to meet the advancing boat were many Franklin's Gulls—visitors on the island for it contains no marsh area suitable to the nesting requirements of this species. Drawing closer in shore the beach was seen to be covered with snowy-breasted California Gulls; on a long sand spit, projecting from the north end of the island, the gathering appeared as a veritable snowbank, and from this point as the boat grounded on the shingle, came hundreds of birds to circle overhead.

No attempt was made to count the many nests found on all parts of the island but in greater numbers on the beach along the base of the pyramid hill. Many were empty, others contained newly hatched young and a few held eggs. Downy young in the nest, or hidden behind stones or in the grass, remained perfectly motionless with heads tucked out of sight—inanimate balls of soft grey down. Some older youngsters ran into the brush, others crowded together on the boulders at the water's edge to waddle into the surf upon being approached. Hundreds of these little grey chaps could be seen far out on the lake riding bouyantly on the waves.

Island Number Two, which previously had been viewed from the peninsula at the south end of the lake, was next visited. Approximately three miles long and over half a mile in width it is believed to contain close to a thousand acres but for reasons unknown does not appear on the township map. The highest elevation—the island is all hilly—was estimated to be three hundred feet. The hills, except along portions of the shore-line where they drop sheer to the sand beach below, are covered with a dense growth of choke-cherry, service berry, gooseberry and other low brush, interrupted at intervals by open, grassy glades. Flanking the base of the hills, well above high water mark, are small stands of poplar.

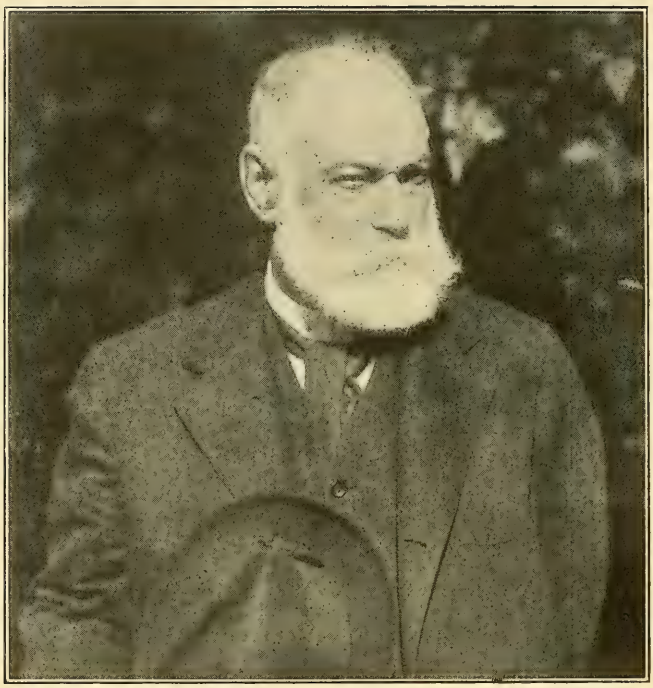
No water fowl nested on this island although situations apparently suitable exist in two rocky points extending into the lake. This is due, undoubtedly, to the presence of coyotes. During the winter, when hunted with dogs on the mainland, coyotes sometimes cross the ice to seek refuge in the almost impenetrable thickets of brush on the island and, finding insular conditions suitable in every way, their stay is prolonged until the ice goes out in the spring and effectually maroons them. In 1921, and for several years previous, rabbits had been abundant; consequently these island coyotes, with an ample food supply and in security from human or canine aggression, had increased rapidly and were more plentiful than on the adjacent mainland. The presence of this predator in large numbers no doubt explains why the stony points are not used as nesting places by water fowl. Flanked by sandy beach and grown up with brush in their centres these points were originally islands of the same type as the densely populated Island Number Three and Island Number Four which were next visited.

These two islands, approximately 300 yards long and 200 yards wide, lie close together in a deep bay on the south shore of the main island where high hills shelter them from the prevailing north-west winds. Sandy beaches, outlined by a belt of coarse grass, surround a jumbled mass of glacial boulders which forms the backbone of the islands. Only a few feet above the surface of the lake they appear, at a distance, to form part of the main island and eventually, with a lowering of the lake level, may do so in fact.

California Gulls circling overhead came out to meet the advancing boat while it was still some two hundred yards from the nearest island, and Double-crested Cormorants, rising heavily, flew far out on to the lake. Pelicans rose more slowly and over a longer interval, indeed, many did not leave until after we had landed, and they flew, only a short distance, some to the adjacent colony others to the channel near the main island.

The nesting colony on the two islands was estimated as follows: Pelicans, 300 pairs; Double-crested Cormorant, 50 pairs, and California Gulls, 75 pairs. Pelicans and Cormorants, nesting close together, occupied most of the space between the boulders in the centre of the islands and the earth was hard packed by the trampling of many birds. Curiously enough a small patch of Lamb's Quarters, *Chenopodium album*, grew on this trampled earth where all other vegetation had been killed out. Nests of all three species contained eggs, or young in various stages of development. The older Pelican youngsters herded together and tumbled over one another while young Cormorants, still in the nest, stretched out their necks and hissed as one walked through the colony. Nests of the California Gulls were situated in the grass close to the beach. Beside one nest containing young was the half-eaten carcass of a Richardson's Ground Squirrel.

There are no fish in Manito Lake and the fishing-grounds of the nesting Pelicans and Cormorants were not discovered. Local residents



GEORGE RIVERS WHITE

report that a small fresh-water lake near Artland, sometimes frequented by Pelicans, contains small fish, probably cyprinoids; but this lake is certainly not the main fishing ground. Specimens of bones and other remains collected on the nesting islands represented fish of considerable size.

(To be continued)

GEORGE RIVERS WHITE
1856-1927

FRIENDS are so scarce in this world that it hurts to record the passing of one. George White was born at Toronto, Canada West, on October 3, 1856, the second son of the late Lt.-Colonel Wm. White, C.M.G., and Elizabeth Keen, his wife. This was during the time when the Government of Canada travelled between Toronto and Quebec, and finally when the Civil Service moved to Ottawa the White family came too. In 1869, the beautiful grounds on the bank of the Rideau were laid out and the home there was completed. Here Mr. E. G. White lives at present, and here Mr. George White lived all his life after coming to Ottawa. George White entered the Civil Service on October 22, 1871, and for fifty years was in the Post Office Department. He enjoyed several years of retirement at the conclusion of this long and honourable service which closed in August, 1921. He was an authority on all matters pertaining to the postal service of the Country, and his knowledge and advice, often sought, was cheerfully given.

Once I asked E. G. White how boys so long ago in Canada beame interested in natural history, and he said simply "We had a good father". To one who knew his father intimately, little surprise is expressed that his son was such a keen student of natural history. George and his younger brothers roamed river, woods and fields in the Ottawa district at a time when Wild Pigeons still nested in McKay's Woods, now in the village of Rockcliffe Park, and there, in fact, they took what since proved to be the last specimens for Ottawa. On this occasion George shot a female and "Ted" not to be trusted with hitting the sitting adult, was left to take a juvenile. These and scores of other rarities, representing an ornithological stage at Ottawa long since gone, were all prepared carefully as specimens, and preserved in the White collection of mounted birds and bird skins—the most important local collection in existence. The birds, which are very numerous in the miniature sanctuary surrounding "Whitehurst", the residence of our late respected friend, had learned to love and trust him and, as in the case of "Old Pybus", the pigeons would actually light on his head.

George White was most methodical in his bird records of all kinds, as indeed in everything else, and at an early date published in the papers of our Club records and lists of birds at Ottawa. He did not write nearly enough—and if any errors ever crept in, as they will, he was more anxious than anyone else to have them corrected. He was, at the time of his death, the correspondent of the Biological Survey at Washington, D.C., of longest standing, having completed with his 1927 record forty-five years of continuous bird migration reports. Following his 1926 report, Mr. W. C. Henderson, Assistant Chief of the Bureau of the Biological Survey, wrote,—

> "This is the longest record of continuous service among our migration observers. We still have six others of the early observers on our roll, but none of them has sent in such full records, spring and fall. We heartily congratulate you on this record, and we hope we may continue to hear from you for many years to come."

During the Canadian meeting of the American Ornithologists' Union in 1926, he opened his home to receive the Survey members and other ornithologists attending the meeting.

The ornithologists' chief complaint against sportsmen is that they do not observe accurately, record their observations, or contribute occasional specimens for ornithological purposes. George White was not that kind of sportsman, for he got keener joy from the sport of being a good ornithologist than he did from his beloved duck hunting, in the pursuit of which he continued up to the time of his death.

And in the way of his passing, though his friends felt the suddenness of the shock, what could have been more beautiful or appropriate? It was on Sunday afternoon, November 27, 1927; he was on a walk along the Ottawa with his best friend, Norman H. H. Lett, as had been his custom; they stopped at George's suggestion to admire the setting sun, and he died as he admired the

golden glow in the West without the slightest illness or suffering. Who could ask more?

George was one of those retiring, kindly souls who, in his own quiet way, was ever extending a helping hand to those in distress and need. Few in comfortable circumstances knew of his generosity to the less fortunate. His left hand seldom knew what the right was doing.

George White was a founder of the Ottawa Field-Naturalists' Club and a member of the Council at the time of his death. He was an Associate of the American Ornithologists' Union, and did his best to help many young people who were learning about nature. His friendship for young people was particularly noticeable, for in spite of his snowy hair he never grew old. He was buried in Beechwood Cemetery, part of the forest where he last saw the Passenger Pigeon and where he had made many other bird records.—HOYES LLOYD and NORMAN H. H. LETT.

LAND MOLLUSCS OF THE ABITIBI REGION

By J. L. HART

DURING June and July of 1925 the writer was a member of an Ontario Fisheries Research Laboratory field party on Lake Abitibi. While in the region advantage was taken of the opportunity of collecting the land molluscs of the district, a list of which is appended. As fisheries work was the primary purpose of the party it was impossible to devote much time to the molluscan fauna and consequently some species occurring in the district are almost certain to be omitted from the list.

The majority of the specimens were taken in the neighbourhood of Lowbush, Ontario (Long. 82°W., Lat. 49°N.).

Acanthinula harpa Say. On grass in moist locations.
Vertigo ovata Say. One specimen only; taken on floating vegetation.
Cochlicopa lubrica Müller. One specimen only.
Vitrina limpida Gould.
Vitrea hammonis Ström.
Vitrea binneyana Morse. Not common.
Euconulus chersinus polygyratus Pilsbury. Plentiful.
Euconulus fulvus Müller.
Zonitoides arboreus Say. Very plentiful.
Zonitoides exiguus Stimp.
Agriolimax campestris Binney. Plentiful.
Pyramidula cronkhitei anthonyi Pilsbury. Plentiful.
Pyramidula cronkhitei catskillensis Pilsbury.
Succinea retusa Lea.
Succinea avara Say.
Succinea ovalis Say. Quite plentiful.
Succinea sp.

The above specimens were identified by Dr. Bryant Walker, to whom I am very much indebted.

FURTHER OBSERVATIONS ON CANADIAN LAND AND FRESHWATER-CRUSTACEA, MADE IN 1928

BY FRITS JOHANSEN

PART II. MALACOSTRACA.

(For Part I, see Canadian Field-Naturalist, Vol. 41, 1927, pp. 132-33.)

DECAPODA

In September, 1926, I received through the Entomological Branch, Dept. of Agriculture, Ottawa, a specimen of a Freshwater-prawn collected by Mr. J. R. Brown of the Collegiate Institute, Hamilton, Ont. In the accompanying letter, Mr. Brown states that he caught it (together with others of the same species) in the beginning of that month "near the shore (of Lake Ontario) on the gravelly bottom of a marsh (pool) near Hamilton."

The specimen proves to be an adult of *Palæmonetes paludosa* Gibbes, the only freshwater-prawn occurring in Canada. This is apparently the first record of it from Lake Ontario, though it is known also from the Canadian side of Lake Erie. For a description, etc., of it, I refer to A. G. Huntsman's "Freshwater Malacostraca from Ontario" (Contrib. Canad. Biol. 1911-14, Fasc. II, Ottawa, 1915, pp. 154-55, fig. 7.).

SCHIZOPODA

Only one species (*Mysis relicta* Loven) of this order of Crustacea occurs in freshwater upon this continent. I have referred to this in *The Canadian Field-Naturalist*, Vol. XXXV, 1921, p. 99; and since then it has been found to be very common in Lake Nipigon, Ontario, where it forms an important item in the food of certain fishes (see Publicat. Ont. Fisher. Research Laborat., XV, XVI, XXIV, XXV, XXVII, in Univ. Toronto Studies, Biolog. Series, Nos. 22 (1923), 25 (1924), 27 (1926)). This makes the seventh locality for the species in North America.

AMPHIPODA.

In *The Canadian Field-Naturalist*, Vol. XXXIV, 1920, p. 128, and VLI. XXXV, 1921, pp. 99-100, I have mentioned the occurrence of the two (or perhaps three) species of the interesting genus *Pontoporeia* in freshwater upon this continent. Since then *P. hoyi* has been found to be very common in Lake Nipigon, Ont., where this shrimp is as important an item in the food of fishes as in the Great Lakes (see Publ . Ontario Fisher. Research Laborat. XV, XVI, XVIII, XIX, XXI, XXIV, XXV, XXVII, in Univ. Toronto Studies, Biolog. Series, Nos. 22 (1923), 24 (1924), 25 (1924) 27 (1926)). Specimens doubtfully referred to *P. filicornis* (not a properly defined species) were also secured in Lake Nipigon (see ditto, XXIV, No. 25, 1924). This makes the fourth locality in Canada for these two species. *P. affinis* has not yet been recorded from freshwater in Canada, but it occurs in lakes in the States of New York and Wisconsin.

Of *Hyalella azteka* I secured a number of specimens during my bicycle trip in the Maritime Provinces in the autumn of 1926. My route was from Chatham, N.B., along the Gulf of St. Lawrence to Pictou, N.S. (with a visit to the west end of Prince Edward Island); then via Truro to Halifax; across to Windsor, and along the coast to Yarmouth, N.S. The specimens follow:

Many (some young) from the mill-pond at Richibucto, N.B., August 29th, 1926.

Seven young ones from the mill-ponds at Bedeque and Tyne Balley, Prince Edward Island, Sept. 11, 13, 1926. These are apparently the first records for the island.

A half-grown specimen from the dam between Scadouc River and inlet, Shediac, N.B., September 4th, 1926.

9 specimens (3 half-grown ones) from pond below the water-reservoir in Victoria Park, Truro, N.S., Sept. 23rd, 1926.

6 half-grown ones from Little Lake (between Mount Uniacke and Windsor), Nova Scotia, September 28th, 1926.

9 specimens (8 immature) from mill-pond at Scott Bay (Blomidon), Nova Scotia, October 2nd, 1926.

3 (one of them half-grown) from brook-pool at Middleton, Annapolis Valley, N.S., October 6th, 1926.

5 immature specimens from Lake La Rose, South Mountain (above Annapolis Royal), N.S., October 8th, 1926.

2 (one of them young) from lake at Port Maitland (north of Yarmouth), Nova Scotia, October 12th, 1926.

Mr. A. English has kindly sent me two, 20-25 cm. long brook-trout (*Salvelinus fontinalis*) caught by him in Long Pond Lake, 14 miles south of St. Johns Newfoundland, in January, 1926. The stomachs of these fishes were full of *Hyalella azteka* (kept). In the United States National Museum is a specimen of *H. azteka* from Lake Manitoba (Rep. U.S.N.M. for 1917, Wash., 1918, p. 99.).

ISOPODA

In *The Canadian Field-Naturalist*, Vol. XXXVI 1922, p. 156, I gave the first record of the western freshwater form, *Asellus tomalensis*, from Canada, viz., the east coast of Vancouver Island. Since then it has been recorded from the same locality (Departure Bay), and in addition from the vicinity of the city of Vancouver, by A. R. Fee, in his paper on the Isopoda from B.C. (Contrib. Canada. Biol. New Ser., Vol. III, Toronto, 1926, pp. 32-33).

Of the other species, *A. communis*, the eastern freshwater form, I have secured the following new records:

Many specimens (adults and young) collected by Prof. A. Willey in Back River, St. Eustache. Montreal Island, Que., on October 9th, 1926. Some of these are now in Ottawa.

8 specimens from Lake La Rose, Annapolis Royal, N.S., October 8th, 1926. F. Johansen coll.

7 specimens from lake at Port Maitland, N.S., October 12, 1926, F. Johansen coll. My identifications of these *A. communis* have been kindly verified by Mr. J. O. Maloney of the U.S.N.M. Washington, D.C.

It is most important to get specimens of fresh water isopods from Manitoba, Alberta and Saskatchewan (if any are found there); so as to be able to define the western limit for *A. communis*, and the eastern limit for *A. tomalensis*.

During my bicycle trip to the Maritime Provinces in 1926 (see above), I collected a number of Land-Isopods (*Oniscidæ*), the first records of them

from Prince Edward Island. The specimens have been kindly identified by Mr. J. O. Maloney in Washington, as follows:—

Water-reservoir at Chatham, N.B., August 26th, 1926; *Porcellio rathkei* Brandt.

Shediac, N.B., September 5th, 1926: *Oniscus asellus* L.; *Cylisticus convexus* (De Geer); *Porcellio rathkei.*

Tyne Valley, P.E.I., September 13th, 1926; *Porcellio scaber* Latr., *P. rathkei.*

Pugwash, N.S., September 19th, 1926: *Porcellio rathkei.*

Pictou, N.S., September 22, 1926: *Oniscus asellus; Cylisticus convexus, Porcellio rathkei.*

Truro, N.S., September 23, 1926: *Porcellio scaber; P. rathkei.*

Public Gardens, Halifax, N.S., September 26, 1926: *Porcellio rathkei.*

Little Lake (between Mount Uniacke and Windsor), N.S., September 28th, 1926: *Porcellio rathkei.*

Avonport (Minas Basin), N.S., September 30th, 1926: *Porcellio rathkei.*

Scott Bay (Bay of Fundy), N.S., October 2nd, 1926: *Porcellio scaber; P. rathkei.*

Head of St. Mary's Bay (Bay of Fundy), N.S., October 01th, 1926: *Oniscus asellus; Porcellio scaber* (together with an Amphipod, *Orchestia grillus* (Bosc.); the latter kindly identified by Mr. C. R. Shoemaker of the U.S.N..M., Wash., D.C.).

GUMWEED (GRINDELIA SQUARROSA (PURSH) DUNAL) IN ONTARIO

By HERBERT GROH

A REFERENCE to occurrences of gumweed in Ontario, which appeared in *The Canadian Field-Naturalist* for February 1929, has prompted me to look into the history of the weed in the east, so far as it is on record in the files of the Canadian Weed Survey of the Division of Botany, Central Experimental Farm, Ottawa.

No records whatever are at hand from any point east of the neighbourhood of Ottawa, Ontario.

The earliest Ontario record appears to be that of W. Scott, in 1891, at Skead's Mills (now Westboro) near Ottawa. This specimen is in the National Herbarium, and a specimen from the same station collected by R. H. Cowley in 1901 is in the Division of Botany Herbarium at the Experimental Farm. The colony is still to be seen along Main Street, Westboro, near the Ottawa river, and along the river towards the new Champlain Bridge. It is growing on rather shallow soil overlying rock, and has not spread much in all these years. Very few people, probably not a great many even of the present members of the Field-Naturalists' Club, are aware of its occurrence in the vicinity of Ottawa. It has also been collected at Rockcliffe Park, at Billings Bridge and within the city limits (Fairmont Ave.).

A specimen collected by Dr. J. A. Carroll at St. Catharines in 1898, and preserved in the National Herbarium, is the second of which we have knowledge. There is a Toronto record for 1912. Gumweed has been found in at least 22 counties throughout Old Ontario, and westward to the Manitoba boundary where it begins to be indigenous. These counties are: Carleton (two townships), Renfrew, Lanark, Hastings, Northumberland, Durham (three townships), York (two townships), Simcoe, Peel, Halton (two townships), Wentworth, Lincoln, Brant, Oxford, Middlesex, Lambton, Waterloo, Wellington, Huron, Algoma, Thunder Bay and Rainy River.

Although somewhat widely distributed, gumweed appears to be nowhere very aggressive. Its natural habitat is the dry prairie, and it is said to be more at home than most plants in fairly alkaline situations. It can scarcely be called a weed of arable land, and is usually found in Ontario in undisturbed ground, waste places and on roadsides. In meadows it will persist by means of its perennial roots, and is rejected by stock on account of its coarse and firmly toothed foliage, and viscid flower heads, so that once it is really established it is likely to remain until the land is plowed. The spread of the weed is accomplished chiefly, no doubt, through commerce in western crop seeds in which its seeds occur as an impurity, and locally by the usual agencies of seed dispersal, including conveyance by carriers to which it may adhere.

It should be noted that I have used the name gumweed for this plant, instead of "tarweed" as in the article referred to above. The plants of the western genus *Madia* are commonly known as tarweeds, and with their heavy-scented excretion, deserve that descriptive term decidedly

more than does the merely sticky *Grindelia*. The only specimen of *Madia* from an eastern locality that I have ever seen was sent to the Division during September, 1928, by Mathias D'Amours, Trois Pistoles, Temiscouata Co., Que. It was said to be growing in a hay field, and was regarded as being weedy and established. The specimen was identified as *Madia glomerata* Hook.

BIRD CENSUS, 1928

Sunday, December 23, 1928. 9.30 a.m. to 4 p.m. Wind south. Clear after wind and rain. Weather for some time previous, very mild with rain and wind. Temp. 42° to 46°. Area covered from Courtenay to Point Holmes (Comox) Vancouver Island, mainly following shore line. Distance about ten miles, by car and on foot. Observers together most of the time.

Western Grebe, 72; Holboell's Grebe, 35; Horned Grebe, 72; Common Loon, 10; Pacific Loon, 10; Red-throated Loon, 3; Pigeon Guillemotte, 1; California Murre, 4; Glaucous-winged Gull, 2200; Herring Gull (Thayer's), 20; Short-billed Gull, 70; White-crested Cormorant, 1; Red-breasted Merganser, 15; Hooded Merganser, 5; Mallard, 640; Widgeon, 250; Green-winged Teal, 6; Greater Scaup, 325; Lesser Scaup, 68; American Golden-eye, 500, Barrow's Golden-eye, 7, Bufflehead, 210; Harlequin, 52; American Scoter, 40; Surf Scoter, 525; White-winged Scoter, 700; Heron (North West), 4; Coot, 11 Aleutian Sandpiper, 1; Red-backed Sandpiper 140; Sanderling, 2; Black Turnstone, 30; Sabine's Grouse, 1, Bald Eagle, 5; Pigmy Owl, 1; Kingfisher, 5; Harris Woodpecker, 1; Gairdner's Woodpecker, 2; Pileated Woodpecker, 1; North West Flicker, 19; Raven, 2; North West Crow, 237; Meadow Lark, 113; Brewer's Blackbird, 20; Pine Finch, 300; Oregon Junco, 22; Rusty Song Sparrow, 14; Sooty Fox Sparrow, 1; Oregon Towhee, 9; Seattle Wren, 5, Winter Wren, 5; Chestnut-backed Chickadee, 30; Western Kinglet, 28; Ruby-crowned Kinglet, 1. Total number of birds, 4841. Total number of species, 54.

INTRODUCED.—English Sparrow, 5; California Quail, 25; Mongolian Pheasant, 6. Total number of introduced birds, 36. Grand total of birds, 4877. Grand total of species, 57.

ALLAN BROOKS and THEED PEARSE, Comox, B.C., observers.

NOTES AND OBSERVATIONS

WANTED—CROWS—DEAD OR ALIVE!—The discovery was recently made at the Division of Pathology, Health of Animals Branch of the Department of Agriculture, that many of the common crows are affected by tuberculosis. This is of special interest as it is the first time that tuberculosis has been found among wild birds (not in captivity).

To aid in further work on this problem we would suggest that those interested in bird life should send crows to the laboratories for examination.

The following suggestions are offered for sending specimens:

(1) When live crows are caught these may be boxed up and sent by express collect. Live crows are more useful for examination.

(2) Crows that have been killed may be boxed up and sent express collect providing the sender lives within a 24-hour journey of Ottawa.

(3) When the sender lives a distance from Ottawa, the lungs, intestine, liver and spleen should be removed, packed in dry borax and sent to the laboratory.

Send specimens to: RESEARCH LABORATORIES, MOUNTAIN ROAD, HULL, P.Q.

N.B.—This is a very important piece of work, both economically and ornithologically, being conducted by Dr. Chas. A. Mitchell in the Animal Diseases Research Institute of the Health of Animals Branch of the Dominion Department of Agriculture. It is to be hoped that all who have opportunity will assist Dr. Mitchell to procure the necessary specimens.—ORNITHOLOGICAL EDITOR.

PROTECTION OF MOOSE.—After reading Mr. Otto Schierbech's article on the moose situation in the Province of Nova Scotia the only conclusion that one can come to is that shooting during the mating season is absolutely wrong.

If the open season started from the 15th of October, the 72.4% of bulls killed from the first to fifteenth might make a very great difference to the 52% of barren cows killed during the ten days in December, and I am on the opinion that not one per cent of the hunters are capable of telling whether a cow is barren or not as the

fœtus in a cow moose in six to ten weeks would be overlooked by the vast majority of hunters.—W. F. H. MASON.

THE SPREAD OF THE BLACK SQUIRREL IN THE TORONTO REGION AND VICTORIA COUNTY, ONTARIO.—While on a visit to Toronto in October, 1926, it was noted with much interest that Black Squirrels had become abundant in the city and its environs. During the period 1898-1910 when the writer was familiar with conditions in this area the Black Squirrel was comparatively a rare mammal. A few frequented High Park, but elsewhere the sight of one was sufficiently unusual to cause comment. A specimen in the gray phase, seen December 26th, 1901, on the west side of the Don Valley, in what was then called the "First Bush", aroused such enthusiasm that several trips were made to the locality in the weeks following in the hope that the animal might again be seen. Black Squirrels were occasionally met with on Lea's Hill (Leaside Junction) and at this place on October 16th, 1902, two specimens were taken.

It was observed also that this species had reached the district north of Coboconk in Victoria County; one being seen on October 6th and a second on October 7th (1926). This district was well known to the writer from 1901 to 1910 and during that time the Black Squirrel was not observed. It was said by one of the oldest residents that in his boyhood, which would be about 1870-75, the species was common.—J. A. MUNRO, Okanagan Landing, B.C.

THE WATER SHREW AT SCOTIA JUNCTION, ONTARIO.—On June 26, 1928, Mr. J. F. Calvert of London, put in some spare time at Scotia Junction, Parry Sound county, by walking west on the railway track which is bordered on each side by low land. Within a mile of the station he picked up a dread shrew which was sent to the collection of the Royal Ontario Museum of Zoology at Toronto, and later on the authority of Dr. Hartley H. T. Jackson determined to be the white-chinned water shrew, *Sorex palustris albibarbis* Cope. The water shrew is sufficiently rare to make its occurrence of interest, and this is the farthest south this species has been reported in Canada. Two water shrews taken by Mr. J. D. Soper at Ridout, Sudbury county, have been referred by Dr. Jackson to Richardson water-shrew, *Sorex palustris palustris* Richardson, and another taken by myself at Rossport on the north shore of Lake Superior, is also well within the range of the latter subspecies.—W. E. SAUNDERS.

AN ENEMY OF THE CORN BORER.—On August 25th and 26th at Picton, Ont., a Downy Woodpecker was noticed in the vicinity of a corn patch. Suddenly a rustling was heard among the cornstalks and on closer observation this Downy Woodpecker was seen to be pecking at the stalks and eating some kind of grub. On examining the stalks mentioned, small holes were noticed in parts where Corn Borer larvæ had been. The Downy Woodpecker was eating the Corn Borers. This is surely another good point in favour of this very useful little bird.—J. ROLAND BROWN.

GREAT HORNED OWL.—A Great Horned Owl spent the winter of 1927-8 in the wooded valleys on the north-eastern border of Toronto. I observed it frequently throughout the winter and often picked up and examined the cast up pellets which strewed the ground under the hemlock groves. Most of these contained the remains of field mice, while bones and feathers of domestic fowl were noted several times.

On December 11, 1927, under some hemlocks, I picked up twelve tail feathers and four primaries of an adult Red-tailed Hawk which had, undoubtedly, been devoured by the owl. The smaller body feathers of the hawk were strewn everywhere and they could be traced, clinging to the branches, right up to the perch where the feast had taken place. Many of the quills bore the marks of the owl's talons, and a large pellet found among the feathers contained unusually large pieces of bone.

It would be interesting to know whether the Red-tail was struck down as legitimate prey or was obtained through some accident. Scarcity of food did not influence the owl as the hawk was eaten in a locality where mice were very plentiful, rabbits common, and domestic poultry procurable as an occasional variation.—R. J. RUTTER.

JACK MINER'S TAGGED WILD GEESE VISIT ANOTHER SANCTUARY.—We have always maintained that ducks and geese visiting a sanctuary would go from one sanctuary to another. Very few of our tagged birds go over two or three years without being reported killed. Occasionally we have one that goes five or eight years, but we have always maintained that in such exceptional cases this bird must have found another sanctuary. Our theory was proved when we got a letter from Mr. Thos. Jones, of Union, Ontario, near Port Stanley, who has for some time been protecting and inducing birds to visit his pond and sanctuary by feeding and protection. He advises us in a letter that two geese with a

family of three are staying at his sanctuary, the two old geese bearing our aluminium tags. Mr. Jones's Sanctuary is fully one hundred and fifty miles east of us and at certain seasons of the year he has two or three hundred geese visit his protected property. Thus as I say, birds know where they are protected and go from one sanctuary to another.—MANLY F. MINER.

BOOK REVIEWS

BIRDS OF WESTERN CANADA, by P. A. Taverner, Second Edition*, revised, Ottawa, 1928, has lately appeared as a publication of the National Museum of Canada. This splendid work is deservedly popular both in Canada and the United States, and the first edition was sold so quickly that many people who wished to get copies were left without them. There can never be any guarantee of future editions of a departmental publication, and so those who are still wanting this book for their libraries will do well to purchase one promptly.

The revised second edition is printed on better paper, making the volume slightly less bulky than its predecessor, and the Department of Public Printing has done excellent work on the plates which seem better than those in the first edition. The changes are mostly minor ones, but one additional species, Lichtenstein's Kingbird *Tyrannus melancholicus satrapa* is included. This unusual record of a Central American bird is based upon the finding of a specimen in the Provincial Museum, Victoria, which was taken at Saanich, Vancouver Island some years ago, and which has only recently been identified†.

For copies of this book, apply to The National Museum of Canada, Ottawa. The price placed upon it is $2.00.—H.L.

*For review of First edition by J. H. Fleming, see *Canadian Field-Naturalist*, XL, 8, pp. 185-6, Nov., 1926.
†Kermode. *Condor* XXX, p. 251, 1928.

CONTRIBUTIONS OF THE ROYAL ONTARIO MUSEUM OF ZOOLOGY. No. 1: *A Faunal Survey of the Lake Nipigon Region, Ontario*, by J. R. Dymond, L. L. Snyder, and E. B. S. Logier (Reprinted from *Transactions of the Royal Canadian Institute*, Vol. XVI, part 2, pp. 233-291, 1928).

This is the initial number of a new series of publications by this active and rapidly growing institution. To some extent the scientific natural history notes here recorded represent collateral results obtained in connection with other investigations in ichthyology and limnology which have been reported on elsewhere (see "The Fishes of Lake Nipigon," by John Richardson Dymond, University of Toronto Studies, Publications of the Ontario Fisheries Research Laboratory, No. 27, 1926, pp. 1-108, p.l xi), and partly cooperative work with parties from the Royal Ontario Museum of Zoology. A general introduction gives an account of the physiography of the region, an important part of any serious faunal or floral study. "The Mammals of the Nipigon Lake Region" are discussed by Professor J. R. Dymond, who gives notes on 37 species known to occur in the region, pp. 239-250. While most of the notes consist of records of captures and life history sketches, many historical notes are given, as well as valuable data on the fluctuations in numbers of some species, particularly of the white-footed mice. "The Summer Birds of Lake Nipigon," by L. L. Snyder, pp. 251-277, contain notes on 99 species or subspecies, 92 of which are represented in the collection. "The Amphibians and Reptiles of the Lake Nipigon Region," by E. B. S. Logier, pp. 279-291, gives notes on 9 amphibians and 2 reptiles.

Local lists of this type are very important and valuable to anybody who is trying to map the distribution or habitat of any species, and they also afford opportunity to put on record many interesting facts in regard to ecology and general life histories. Carefully annotated lists not only give an accurate picture of the status of each species at the present time, and particularly in regions like much of western Ontario, where rapid changes in environment are being made by the advances of settlement and civilization, will be of great value for comparison in the future. It is to be hoped that the museum workers from Toronto who are carrying on this field work in different parts of the Province from year to year, will continue to record their observations in such convenient and attractive form.—R.M.A.

CONTRIBUTIONS OF THE ROYAL ONTARIO MUSEUM OF ZOOLOGY. No. 2: *A Faunal Survey of the Lake Abitibi Region, Ontario*, by the Staff of the Royal Ontario Museum of Zoology. (Reprinted from *University of Toronto Studies:* Biological Series No. 32, 1928. pp. 1-46, pl. i, 1 map. Published out of a donation by Wm. Robertson, Esq.

This, the second number of the above series begins by a general description of the area in question, its life zone and faunal area, previous work, and literature cited, by L. L. Snyder, pp. 3-6. "The Mammals of the Lake Abitibi Region," by L. L. Snyder, pp. 7-15, comprises notes on 34 species found in the region. "The Summer Birds of Lake Abitibi," by L. L. Snyder, pp. 17-34, discusses 245 specimens of 85 species collected, and 17 more species included in the list because of positive sight records. J. R. Dymond gives notes on 6 amphibians and 1 reptile in "The Amphibians and Reptiles of the Lake Abitibi Region," pp. 35-36. In a paper on "The Odonata (Dragonflies) of the Lake Abitibi Region," pp. 37-44, Professor E. M. Walker gives notes on 31 species collected by N. K. Bigelow as a contribution to a biological survey of the lake, and in addition discusses a small number of nymphs taken in seine hauls by J. R. Dymond and J. L. Hart. "Spiders from the Lake Abitibi Region," determined by J. H. Emerton, Boston, Massachusetts, the well-known spider specialist, is a bare list of 32 species, with localities and dates. Both of the above "Contributions" should be in the working library of any naturalist interested in the wild life of western Ontario.—R.M.A.

MOCKINGBIRD (*Mimus polyglottos*).—On June 4th, 1928, this bird was taken by Mr. Sam Waller at Moose Factory, James Bay, Ontario. It was seen and heard singing and as its call was so different from any other bird, the Indians could not recognize it. According to their reports it is the first one known to have been seen in that part of the country. Mr. Waller was very fortunate in securing this bird and forwarded it to the Provincial Museum. We have had it mounted and it is a beautiful specimen.—ROBERT VIRTUE, *Provincial Museum, St. James Square, Toronto, Ontario.*

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CONTENTS

	PAGE
Some Heavy Detrital Minerals in Canadian Sediments. By F. J. Fraser	117
Glimpses of Little-Known Western Lakes and Their Bird Life. By J. A. Munro (Cont'd)	128
Cyril Guy Harrold—An Obituary	132
Butterflies Observed in the Sudbury District, Ontario. By E. D. Kindle	134
Field Work of National Museum of Canada, 1929. By W. H. Collins, Acting Director	134
Notes and Observations:	
The Water Shrew (*Sorex palustris*) in Ontario. By R. M. Anderson	136
Some Little Brown Bats from Ontario. By J. R. Dymond	137
Western Ragweed Farther East. By Herbert Groh	137
Bird Banding Returns—Two Corrections	137
Some Amphibians of Western North America. By Clyde L. Patch	137
Official Canadian Bird-Banding Returns	138

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The Canadian Field-Naturalist

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SOME HEAVY DETRITAL MINERALS IN CANADIAN SEDIMENTS[1]

By F. J. FRASER

THE difficulty of assigning a definite geological age to sedimentary rocks which are devoid of fossils has resulted in the gathering together of all possible records concerning sediments, and amongst these, heavy accessory minerals play an important part. The trend of investigation in this branch of sedimentary petrography is reflected in papers published by Edson, [2] McLearn, [3] Wallace and McCartney [4] and Condry. [5] As the interest in heavy detrital minerals appears to be substantially increasing, the accompanying notes and sketches have been assembled for the use of those to whom the subject is comparatively new.

Systematic records of accessory minerals in sedimentary rocks may ultimately prove of considerable value in the working out of geological problems. Crystalline igneous rocks seem to have their own local suite of accessory minerals; at present, while much work continues to be done on the accessories in sedimentary rocks, little has been done on those in igneous rocks, so that from the point of view of suggesting origins of particular sediments, sedimentary workers are, therefore, more or less marking time. In 1915, Rastall and Wilcockson published a paper along these lines, [6] but more recent papers by Mackie, [7] Brammall, [8] and Ghosh [9] show that this important aspect of intensive petrography is beginning to be recognised.

A word as to the identification of the commoner heavy detrital grains may not be out of place here. Zircon, apatite, tourmaline and hornblende are in most cases easily recognised because of their habit. Constant familiarity with many varieties of grains is the key to sure identification; grains may be recognised over and over again without positive identification. An exchange of marked slides with other workers soon adds to the list of minerals that can be recognised with certainty; appended is a list of diagrams published which are worth inspecting by those interested. Regarding the optical properties of the minerals discussed, these are not given; such may best be obtained by reference to Milner, [10] supplemented by Dana, [11] Winchell, [12] Johannsen [13] and Larsen. [14] The worker to whom the subject is attractive is advised to read all descriptions of "heavy" grains in sediments such as are to be found since 1915 scattered through the Quarterly Journal of the Geological Society, Geological Magazine, Proceedings of the Geologists' Association, Transactions of the Edinburgh Geological Society, and Proceedings of the Liverpool Geological Society. For complete bibliography and a readable summary of the progress of sedimentary petrography, Boswell's addresses and papers in the Proceedings of the Liverpool Geological Society [15] are outstanding. Later references than these will appear in the new edition of Milner's Sedimentary Petrography to be published by Murby (London) this year (1929).

NOTES ON THE GRAINS FIGURED.

ANATASE is rarely identified by transmitted light on initial examination under the low power because it frequently looks opaque; if much tabular anatase is present on a slide, the straight

[1] Published with the permission of the Director, Geological Survey of Canada, Ottawa.

[2] Edson, F. E., Criteria for the Recognition of Heavy Minerals in the Mid-Continental Field. Bull. 31, Oklahoma Geol. Survey. Dec., 1925.

[3] McLearn, F. H., Stratigraphy, Structure, and Clay Deposits of Eastend Area, Cypress Hills, Saskatchewan. Summary Report, Geol. Survey Can. 1927, Part B.

[4] Wallace, R. C., and McCartney, G. C., Heavy Minerals in Sand Horizons in Manitoba and Eastern Saskatchewan. Trans. Roy. Soc. Can. Vol. 22, Sect. 4, 1928.

[5] Condry, C. D., Heavy Minerals in the Roubidoux and other Sandstones of the Ozark Region, Missouri, Journ. Palæontology, March, 1929.

[6] Rastall, R. H., and Wilcockson, W. H., Accessory Minerals of the Granitic Rocks of the English Lake District. Q.J.G.S., Vol. 71, 1915.

[7] Mackie, W., The Heavy Accessory Minerals in the Granites of Scotland. Trans. Edin. Geol. Soc., Vol. 12, 1928.

[8] Brammall, A., Dartmoor Detritals, A Study in Provenance. Proc. Geol. Assoc. Vol. 34, Part 1, 1928.

[9] Ghosh, P. K., The Mineral Assemblage of the Falmouth Granite (Cornwall). Proc. Geol. Assoc. Vol. 34, Part 3, 1928.

[10] Milner, H. B., An Introduction to Sedimentary Petrography. 1922. Supplement, 1926.

[11] Dana (Ford), Text Book of Mineralogy, 3rd ed., 1922.

[12] Winchell, N. H., Elements of Optical Mineralogy, 1922.

[13] Johannsen, A., Essentials for the Microscopical Determination of Rock-forming Minerals and Rocks in thin sections. 1922.

[14] Larsen, E. S., Microscopic Determination of the Non-Opaque Minerals, U.S.G.S., Bull. 679, 1921.

[15] Boswell, P. G. H., Presidential Address, Proc. Liverpool Geol. Soc., Part 4, Vol. 13, 1923, P. A., Part 1, Vol. 14, 1924, Progress of Investigation in the Mineralogical Composition of Sedimentary Rocks, Part 2, Vol. 14, 1925. Some recent Work on the Petrography of Sedimentary Rocks, Part 4, Vol. 14, 1927.

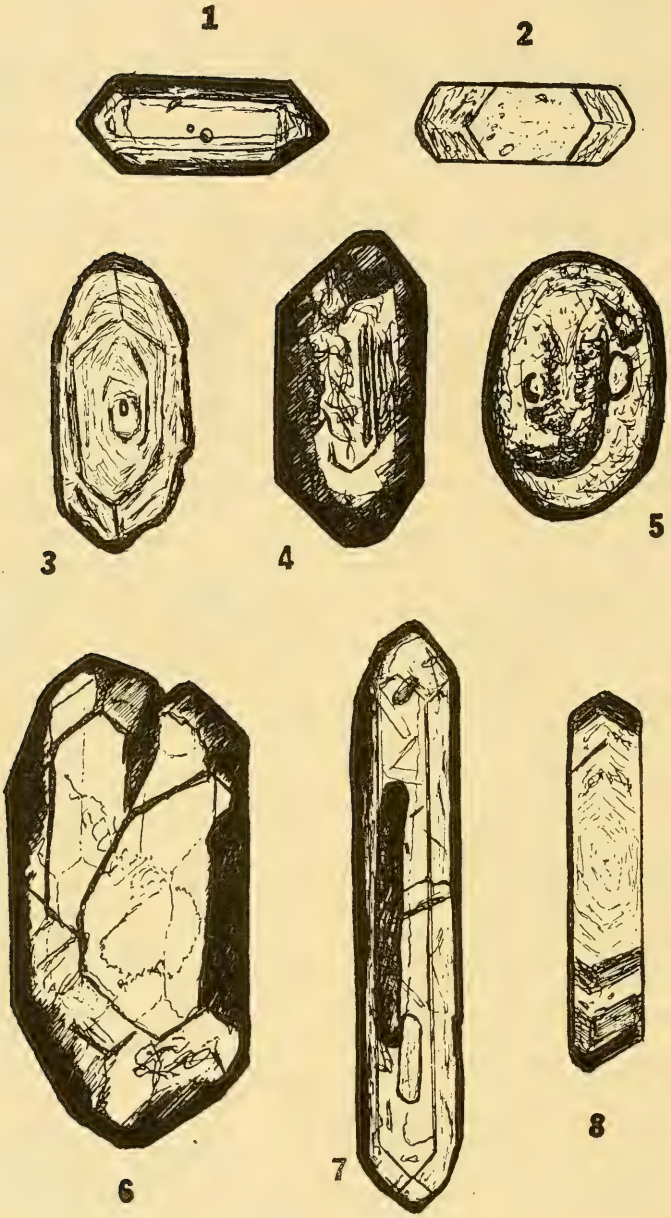

FIGURE 1.—ZIRCON.

1. Vulcan Well No. 2, 3220 feet. Length 0.1 mm. T.V.O.
2. Cypress Hills. Length 0.08 mm.
3. Vulcan Well No. 1, 3760 feet. Length 0.15 mm. T.V.O. Shows zoning.
4. Cypress Hills. Length 0.2 mm. Purple variety.
5. Cypress Hills. Length 0.1 mm. Purple variety; well worn, pitted and somewhat cloudy, with inclusions.
6. Okalta Well No. 1, 4020 feet, T.V.O. Doubly capped at one end. The faces on the lower side can be seen very clearly when focussed through the crystal; these are sketched in. Length 0.18 mm.
7. Cypress Hills. Shows inclusions. Length 0.2 mm. Needle variety.
8. Cypress Hills. Shows zoning which is most pronounced when oriented in same position as tourmaline showing least absorption; at right angles to this position, the zoning is hardly perceptible. The heavier bands of zoning are brownish, and may be referable to those cited by Mackie (*op. cit.* page 24) as "midway between the centre and periphery". Length 0.14 mm.

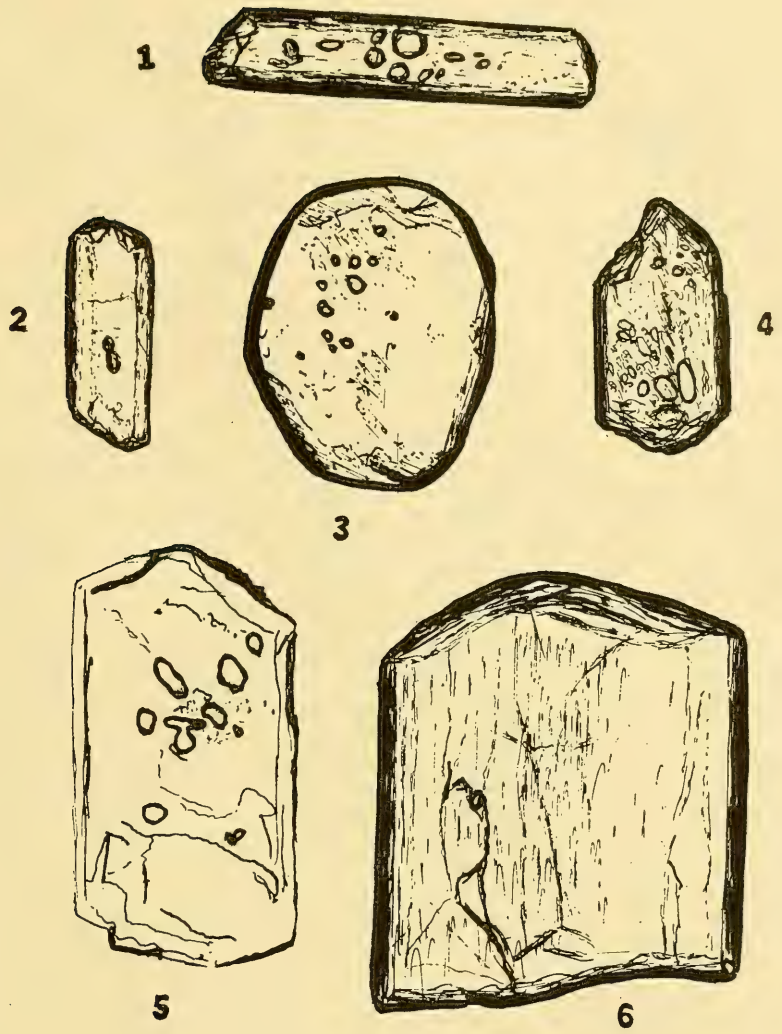

FIGURE 2—TOURMALINE.

1. Cypress Hills. Green, with inclusions. Length 0.12 mm.
2. McLeod Well No. 2, 1900 feet, T.V.O. Length 0.12 mm.
3. Calmont Well No. 1, 1920 feet, T.V.O. Length 0.1 mm. Well worn; pleochroism, yellow to olive green.
4. Cypress Hills. Pink variety. Length 0.08 mm.
5. Cypress Hills. Pink variety; prismatic grain with globular inclusions. Length 0.18 mm.
6. Cypress Hills. Pink variety. Length 0.16 mm.

edges and outgrowths, not suggesting pyrites or magnetite, will furnish a clue. The habit of anatase is best inspected under a high power with a good strong field, when the sharply cut edges and frequent tabular outgrowths may be observed, although the latter may be so small that considerable experience is required before they can be spotted quickly. The birefringence and dispersion are so high that, with crossed nicols, the result is a confusing blur with occasional but definite reds and blues—frequently as tiny points. The position of extinction can rarely be determined with any degree of satisfaction; in the grain figured, there is only one position in which the grain gives good colour banding on the pyramid. Under reflected light, anatase appears white and snowy. The identification of this grain is a case in point where a long list of optical properties is utterly useless.

BARYTES occurs most frequently in one of two habits, irregular patchy grains, and platy fragments with well developed cleavage—the latter often showing re-entrant angles. The irregular patchy grains, as Milner says[16] "rarely show signs of wear though they may be intensely fractured". The interference colours in grains of 0.1 mm. are up to reds and blues, and yellows are the predominant colour; this is a valuable diagnostic point. Further, these grains are speckled and look granular owing to minute inclusions; cleavage fragments (diamond shaped) and well developed platy crystal fragments, on the other hand, are usually much clearer, but may show inclusions arranged in zones. Small platy grains of barytes, andalusite, apatite, kyanite topaz, and sometimes colourless epidote cannot easily be distinguished from one another; in larger grains, however, identifiable characteristics are much more pronounced. In a fine sediment where the presence of any of these six minerals might be suspected, the final decision should be influenced by the presence of the larger grains which can be identified. Omissions in records are more forgivable than doubtful identifications, and lead to far less irritation when the records are subsequently checked up by another worker—perhaps years afterwards.

ANDALUSITE does not show pleochroism as frequently as one would be led to suppose by the text books; figures are of little help. This mineral has much the same refractive index as barytes and apatite, and is not easily distinguished from either of these minerals in small irregular grains, although an apatite flake may show a uniaxial figure. The birefringence in a number of differently sized grains is possibly the most helpful guide, and andalusite possesses a "harder tone" of relief than apatite—due possibly to its greater resistance to wear rather than to the slightly higher refraction of the former. Undoubtedly the solubility of apatite in hot acid is the best means of estimating its relative abundance in the presence of a mineral with which it is easily confused.

GARNET is isotropic, and should, therefore, be easily recognised.

HORNBLENDE has good colour, cleavage, and oblique extinction. Isolated bleached grains may present greater difficulties.

RUTILE presents little difficulty in large grains; small grains are frequently to be identified only under the high power, when the amount of colour in a strong field is surprising when compared with that under a low power. In Canada, where the titanium content of some sediments is probably high, many concentrates may contain yellowish grains of a high refractive index referable to a titaniferous aggregate rather than to a specific mineral.

TITANITE (sphene), when in large grains, frequently possesses outstanding properties, but smaller grains may present difficulty until considerable experience has been gained. Brammall (*op. cit.*, page 39) says "The positive identification of sphene in minute grains is notoriously troublesome, the grains often resembling zircon, or even anatase and cassiterite, and their identification may involve time quite out of proportion to their relative importance". Large fractured grains may, initially, be confused with zircon. The colour of the titanite grains figured is very slight and masked by the high relief and lustre; they may possess a faint smoky tint. Their appearance under crossed nicols suggests a metallic blue lustre rather than a colour; grains usually give a good positive biaxial figure showing very high dispersion. In plane polarised light these grains possess a lustre unlike that of any other common mineral.

ZIRCON is so uniformly common in concentrates that it is the first mineral to be identified with confidence. Perhaps as the search for zenotime and cassiterite proceeds, this confidence is lessened. The only comment offered here is that zoning in zircon is most pronounced when the crystal is oriented in the position of tourmaline showing least absorption.

APATITE most commonly occurs in slightly worn prismatic grains polarising in greys; such grains do not give good interference figures, but have negative elongation. Apatite grains have the appearance of a soft tone in a moderately illuminated field—a helpful diagnostic point. Close

[16] *op. cit* page 34 (Introduction).

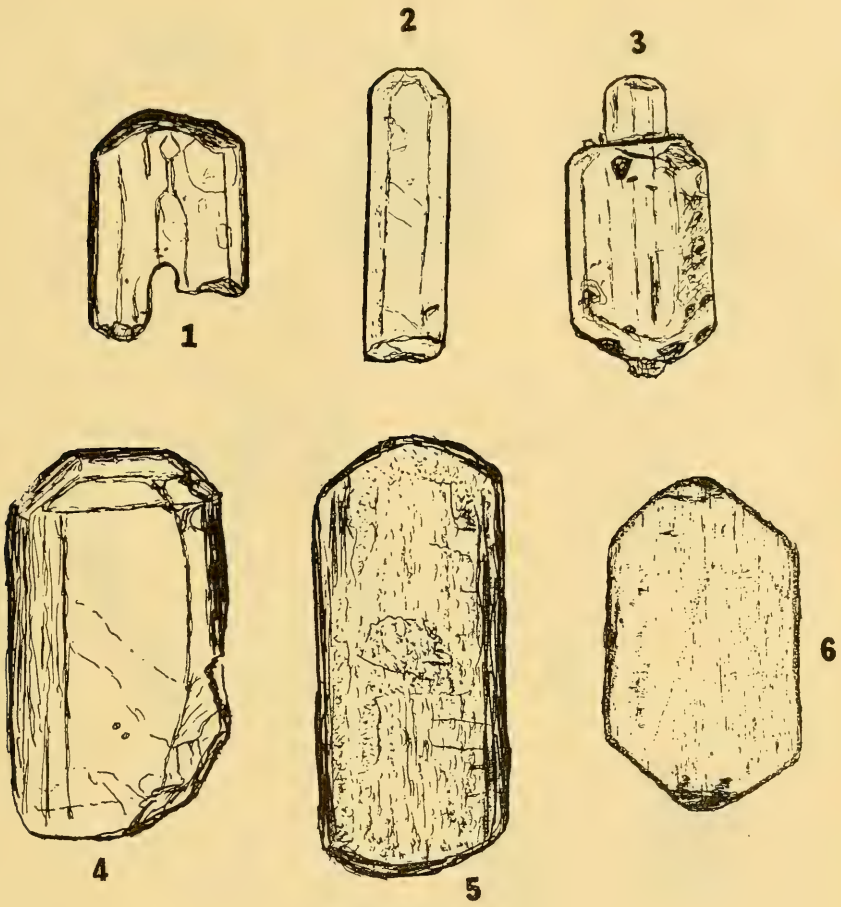

FIGURE 3—APATITE.

1. Cypress Hills. Length 0.08 mm.
2. Cypress Hills. Small prismatic grain. Length 0.1 mm.
3. Cypress Hills. Shows secondary growth. Length 0.14 mm.
4. McLeod Oil Well No. 2, 3310 feet, T.V.O. Crystal faces very well defined. Length 0.15 mm.
5. Cypress Hills. Brown pleochroic variety.
6. Vulcan No. 1, 3760 feet, T.V.O. Brown pleochroic variety. Length 0.2 mm.

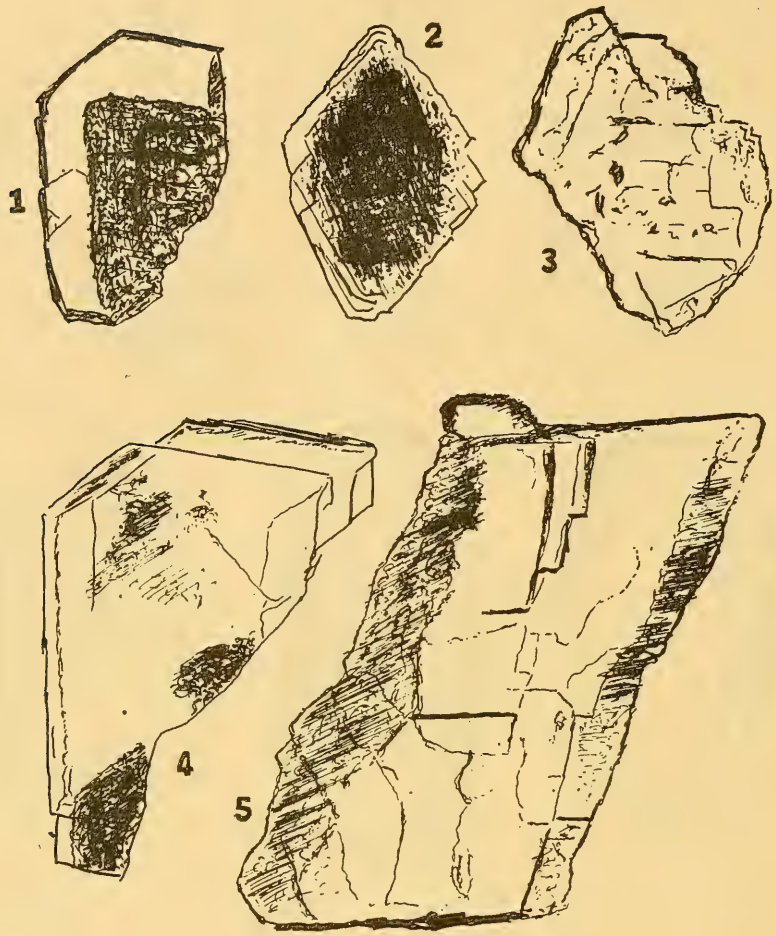

FIGURE 4—BARYTES.

1 and 2—Devenish Petroleum Well No. 1, 375 feet. Shows zoned arrangement of inclusions. Length about 0.15 mm.

3. Bow River Well No. 1, 1260 feet. Length about 0.15 mm.

4 and 5. Locality unknown. Note patches of inclusions in 4. Length about 0.25 mm.

examination with high power may show pitting or unevenness of surface due to abrasion. Basal pinacoid faces are present when accompanied by pyramid faces, otherwise the ends are flattened owing to parting parallel to 001; this parting is also fairly common at or near the centre of the prism, but is rarely seen near the ends—probably owing to less cohesion in the latter position; sometimes the partings do not extend right across the prism, and may show an appearance suggesting solution along the parting. Basal sections under plane polarised light, unless strongly illuminated, may suggest garnet by reason of outline and the reflection of illuminating rays from faces almost parallel to them producing a border darker than that usually associated with apatite. Irregular fragments (fretted apatite) may be confused with andalusite, but such are likely to lie parallel to 001 in which case they will give good uniaxial figures. Prismatic andalusite grains may simulate apatite in appearance, but have a higher birefringence, although not high enough to be useful in the case of very small grains. The value of the solubility of apatite in hot acid for confirmation has already been noted under andalusite. Smoky, and particularly brown, pleochroic apatite should be looked for in Canadian sediments. Cored apatite grains such as are described by Fleet and Smithson [16] should be carefully recorded. Information is wanting on cored apatites in igneous rocks.

HYPERSTHENE possesses a distinctive pleochroism, pink to green, and should be easily recognised on this account. As a rule the interference figure is not good.

TOURMALINE is easily recognised on account of its very strong pleochroism. Pink, green and brown tourmaline are probably much more common in Canadian sediments than the blue variety; any blue tourmaline should therefore be carefully recorded.

OTHER PUBLISHED DIAGRAMS.

While references to papers dealing with heavy detrital minerals are many, workers not familiar with the appearance of these minerals are often at a loss for good diagrams; as one good diagram is worth a page of description, the following list of papers which contain useful reproductions of individual grains will be found of service in this respect.

TEALL, J. J. H., British Petrography, 1888.
Plate 44.—Zircon, kyanite, tourmaline, rutile, anatase.
Plate 47.—Glaucophane, sphene.

CAYEUX, L., Carte Geologique de la France. Etude pétrographique des Roches Sedimentaires, Atlas.
Plate 8, Figure 3.—Dolomite.
Plate 17.—Figures sixty-four grains which include tourmaline, zircon, rutile, anatase, brookite and kyanite.

THOMAS, H. H., Mineralogical Constitution of the finer Material of the Bunter Pebble Beds in the West of England Q.J.G.S., 1902.
Plates 31 and 32.—Zircon, rutile, tourmaline, tabular anatase and brookite.

BOSWORTH, T. O., Heavy Minerals in Sandstones of Scottish Carboniferous Rocks. Proc. Geol. Assoc., Vol. 24, 1913.
Plate 10, page 57.—Garnet, zircon, magnetite, rutile, tourmaline, staurolite.
Plate 11, page 58.—Garnet.

BOSWELL, P. G. H., The Stratigraphy and Petrology of the Lower Eocene Deposits of the North Eastern Part of the London Basin. Q.J.G.S., Vol. 71, 1915.
Plate 47, Fig. 5.—Kyanite.
Plate 48, Figs. 2 and 3.—Apatite.
Plate 49, Fig. 2.—Staurolite at 1 o'clock.

BOSWELL, P. G. H., Petrography of the Sands of the Upper Lias and Lower Inferior Oolite in the West of England. Geol. Mag., 1924.
Page 253, Fig. 3.—Sagenite rutile.
Page 255, Fig. 4.—Kyanite.
Page 255, Fig. 5.—Titanite (Sphene.)

RASTALL, R. H., and WILCOCKSON, W. H., Accessory Minerals of the Granitic Rocks of the English Lake District, Q.J.G.S., Vol. 71, 1915.
Figures 1, 4, 5, 6, 7 and 8.—Zircon.
Figure 2.—Titanite (Sphene.)
Figure 3.—Anatase and Brookite.
Figure 9.—Anatase.

LEWIS, H. P., Detrital Barytes in Permian Basal Sand at Nitticargill. Geol. Assoc., Vol 60, 1923.
Page 310.—Cleavage flakes of barytes.

ROBERTSON, T., Heavy Minerals in West Togoland. Geol. Mag., Vol. 60, 1923.
Page 494.—Zircon.

[17] Fleet, W. F., and Smithson, F., On the Occurrence of Dark Apatite in Some British Rocks. Geol. Mag., Vol. 65, 1928.

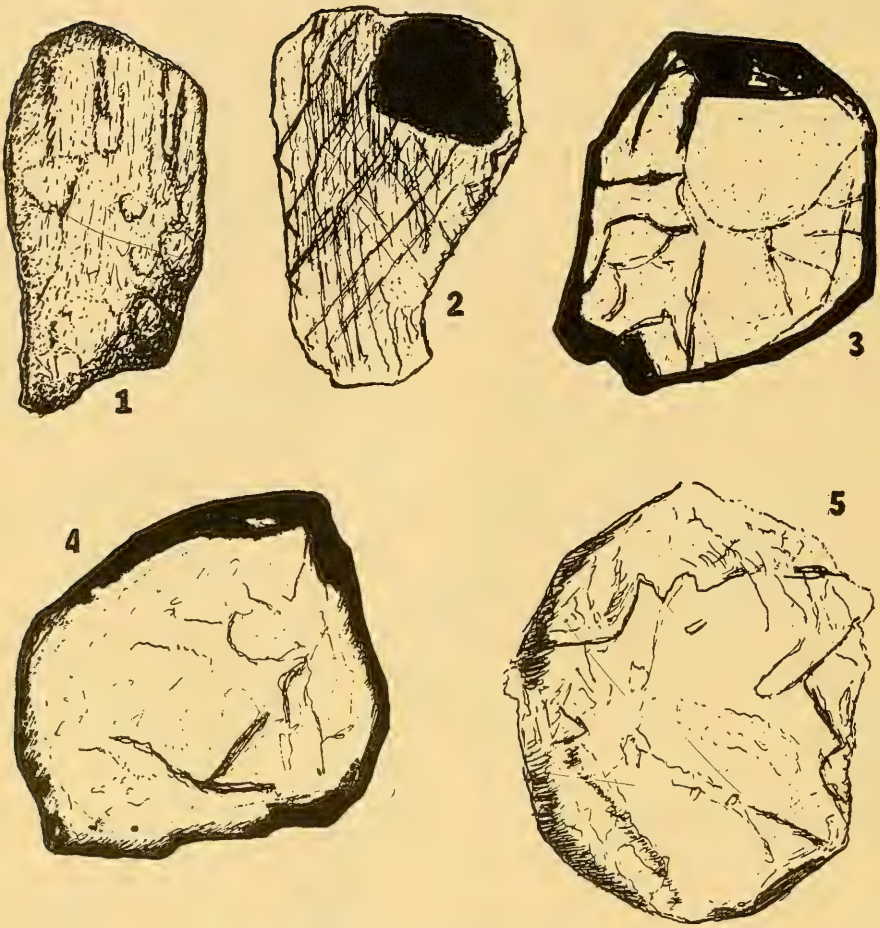

FIGURE 5—HYPERSTHENE, DOLOMITE, GARNET, ANDALUSITE.

1. Hypersthene. Pleochroism, pink to green. Grain has roughly prismatic form; slight cloudiness may be superficial; Dana figures hypersthene altering to actinolite on the surface. From the Lakeshore, Humber Mouth, Lake Ontario.
2. Dolomite. Grain shows excellent twinkling, and twining in one or two directions according to orientation; shows no extinction. Length 0.18 mm. From the Regent Well No. 1, 2200 feet, T.V.O. (The dark splotch is a superimposed grain, not an inclusion).
3. Worn Garnet. Glacial sand, Ottawa. Length 0.14 mm.
4. Hypersthene. Glacial sand, Ottawa. Length 0.17 mm.
5. Andalusite. Colourless; polarisation colours greys to yellow. Ranchman's Well No. 1, 1300 feet. Length 0.18 mm.

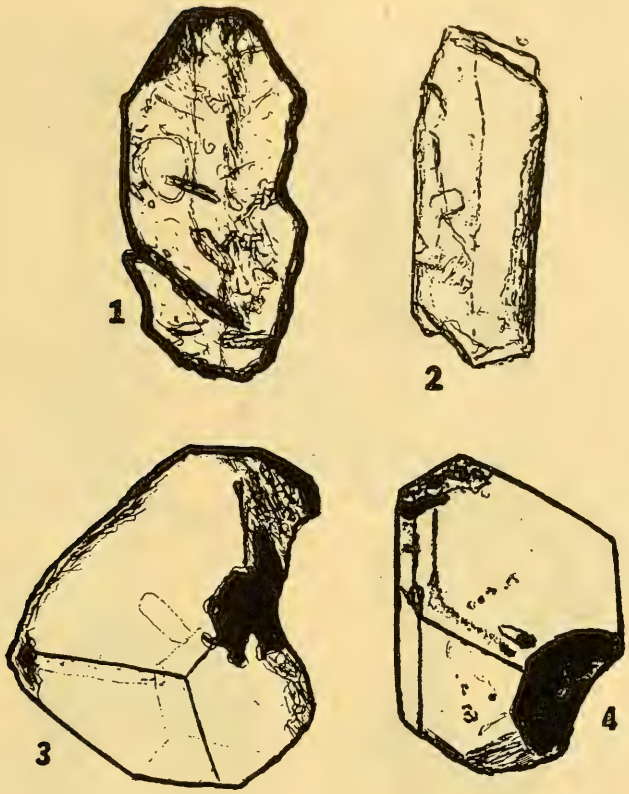

FIGURE 6—TITANITE (SPHENE), ANDALUSITE.

1, 3 and 4. Titanite (Sphene). Grains have submetallic lustre; colour brown, faint but perceptible; very high relief; anomalous polarisation colours. Interference figure good and shows high dispersion. From Cypress Hills. Length about 0.12 mm.

2. Andalusite. Pleochroic, pink to colourless. Pink when orientation is as for tourmaline showing minimum absorption. Cypress Hills. Length 0.12 mm.

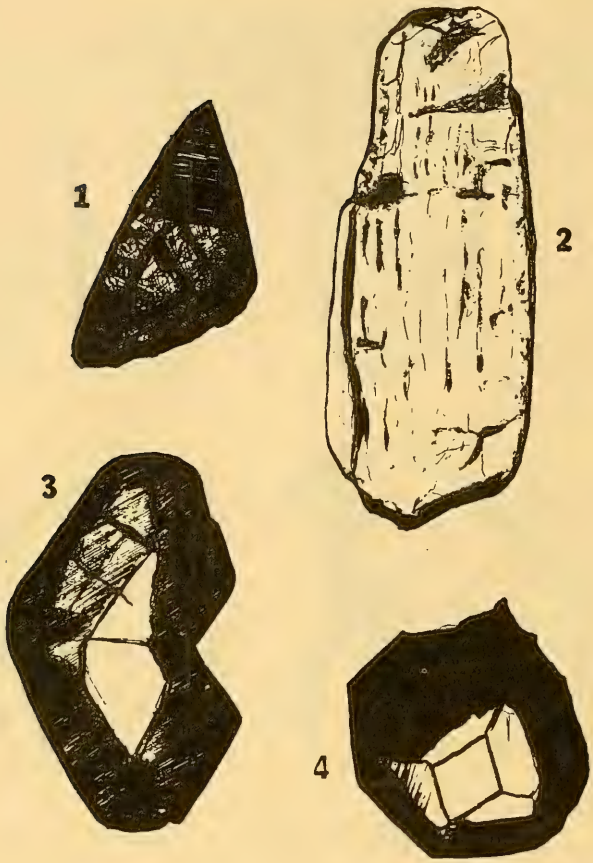

FIGURE 7—ANATASE, HORNBLENDE, RUTILE, GARNET.

1. Pyramidal anatase showing striations parallel to 001. Length 0.1 mm. Vulcan Well No. 2, 2860 feet, T.V.O.
2. Green hornblende. Glacial Sand, Ottawa. Length 0.2 mm.
3. Rutile knee twin. Length 0.08 mm. Cypress Hills.
4. Pink garnet partly fractured, but showing dodecahedral faces. About 0.1 mm. British Dominion Well No. 1, 6040 feet, T.V.O.

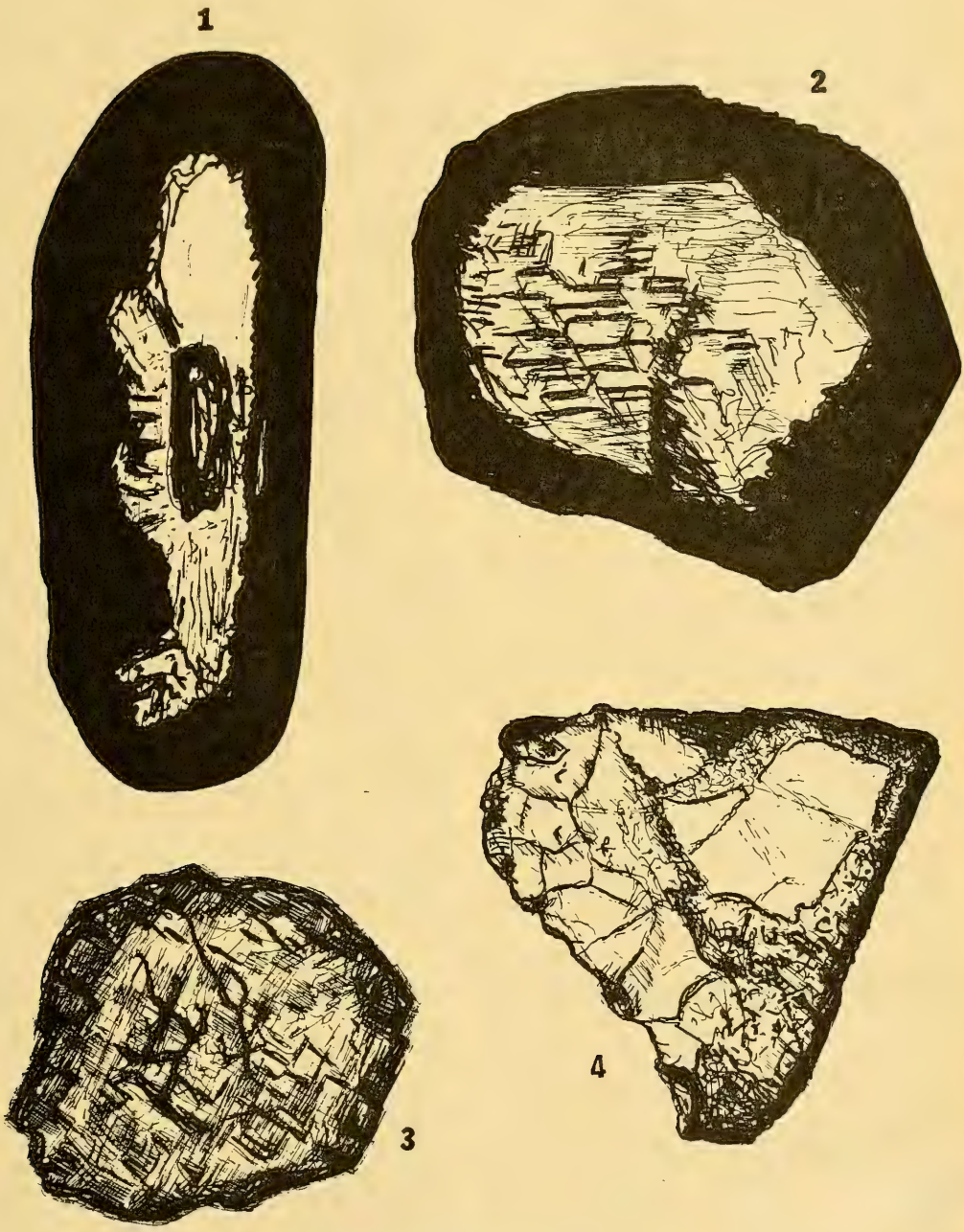

FIGURE 8—ZIRCON, GARNET.

1. Worn purple zircon; very clear and bright. Length 0.27 mm. McLeod Well No. 2, 2100 feet, T.V.O.
2. Garnet showing dodecahedral cleavage. About 0.2 mm. McLeod Well No. 2, 2100 feet, T.V.O.
3. Garnet showing dodecahedral cleavage. About 0.15 mm. McLeod Well No. 2, 2225 feet, T.V.O.
4. Fractured garnet. Length 0.18 mm. Vulcan Well No. 1, 3780 feet, T.V.O.

FLEET, W. F., Notes on the Triassic Sands near Birmingham. Geol. Assoc., 1923.
Plate 10.—In upper photograph is shown a grain of staurolite with good hackly fracture.

STUART, A., Petrology of the Dune Sands of South Wales. Geol. Assoc., 1924.
Page 322, Fig. 26.—Dolomite.
At the end of paper; Hypersthene, staurolite, barkevite, zircon, garnet, kyanite, zoisite, fuchsite, anatase.

DOUBLE, I. S., Petrography of the Lower Tertiary Deposits of the East of England. Geol. Assoc., 1924.
Figure 28.—Chiastolite, garnet, staurolite.

MELMORE, S., River Sand from the Ure and Ouse above York. Geol. Assoc., Vol. 63, 1926.
Page 270.—Barytes.

BRAMMALL, A., Dartmoor Detritals, A Study in Provenance.
Plate 2, page 28.—Zircon, monazite, cassiterite, brookite, anatase.
Figure in text, page 44.—Dumortierite.

GHOSH, P. E., The Mineral Assemblage of the Falmouth Granite. Proc. Geol. Assoc., Vol. 34, 1928.
Plate 23, at the end of paper.—Zircon, monazite, anatase, brookite, cassiterite.

WALLACE, R. C. and MCCARTNEY, G. C., Heavy Minerals in Sand Horizons in Manitoba and Eastern Saskatchewan. Trans. Roy. Soc. Can., Vol. 22, Sect. 4, 1928.
Figure 5.—Kyanite well shown in upper centre of photograph.

GROVES, A. W. and MOURANT, A. E., Inclusions in the apatites of some igneous rocks. Mineralogical Mag., June, 1929, Vol. 22, p. 95. Ten figured grains of cored apatite.

MACKIE, W., Acid potassium sulphate as a petrochemical test and solvent, Trans. Edinburgh Geological Soc. Vol. 11, Part 2, 1923. Plate 15, p. 126. Fig. 3 shows good anatase. Also in the same volume: The source of the purple zircons in the sedimentary rocks of Scotland. p. 212, Plate 25, Fig. 2. Zircon.

RAEBURN, C. and MILNER, H. B., Alluvial Prospecting, 1927. (Murby).
In the Descriptions of Minerals, page 347 *et seq.*, the figures in the text are useful in helping the investigator to acquire familiarity with the crystal faces of detrital grains.

KEY TO MINERALS IN FIGURES.

All grains have been drawn by the Author by means of a camera lucida as they appear under a high power, and do not therefore show the thick black borders which are so characteristic of heavy detrital grains when viewed under a low power. T.V.O. refers to material from the Turner Valley Oilfield near Calgary. Cypress Hills refers to material collected by Dr. F. H. McLearn (*op. cit.*) in the Eastend Area, Saskatchewan, and on which work is still proceeding. Slides from which grains have been figured are permanently mounted and filed in the collection of the Borings Division of the Geological Survey. Reproductions are from (wet plate process) photographs of originals made by the Photographic Division of the Geological Survey.

GLIMPSES OF LITTLE-KNOWN WESTERN LAKES AND THEIR BIRD LIFE

By J. A. MUNRO

(*Continued from page 103*)

AMIDST rolling, brush-covered hills and cultivated farm lands north-east of Radison, Saskatchewan, lies Redberry Lake. This is an alkaline lake approximately eight miles long and six miles wide exclusive of the narrow, shallow arms at the north and south extremities. Along portions of the shore grassy hills, dotted with clumps of wolf-willow and poplar, slope to beaches of clean sand and gravel; other portions, less hilly, are clothed with thick poplar growth almost to high-water mark where poplar gives place to wolf-willow.

The islands, seven in number, are perhaps the most valuable portions of the lake. Three of these are mere reefs of the type common to prairie lakes; the remaining four are wooded, two being separated from the mainland by narrow, shallow channels, and two situated a mile or more from the nearest shore.

Unfortunately, at the time of my visit on June 18th, 1921, the only boat on the lake was out of commission and it was impossible to reach the islands. For information regarding their bird-life I am indebted to Mr. Camille Martin, a resident farmer who is familiar with, and interested in, the nesting water-fowl of the region.

Both land and water birds were abundant; the following list includes the species encountered during the single day of my visit and those reported by Mr. Martin:

HOLBOELL'S GREBE—Amongst the strangely-mingled sounds that greeted one on approaching the lake shore, the long braying call of Holboell's Grebe was constantly heard although only a few individuals were observed. This species was believed to be nesting in several of the marshy sloughs close to, but not connected with, Redberry Lake.

LOON—One seen flying over the lake.

CALIFORNIA GULL—About 30 individuals seen at different points on the lake. Mr. Martin informed me that "Blue Gulls" nested on two of the small reefs near the east shore of the lake.

FRANKLIN'S GULL—Abundant everywhere flying over the fields and the lake. A band of 30 occupied a sand-beach opposite one of the wooded islands but no large gathering, such as that observed at Manito Lake, was encountered.

COMMON TERN—Reported to nest on two of the brush-covered islands. A few were seen following the shore line of the mainland in their fishing operations.

BLACK TERN—A small breeding colony was found inhabiting a grassy slough on Section 22–42–9–W. 3.

DOUBLE-CRESTED CORMORANT—A flock of eight seen flying towards one of the large islands. This island, fairly well wooded, is conspicuous by reason of a long rocky point projecting from its south east corner. Mr. Martin informed me that this situation was occupied each year by a nesting colony of "Black Loons". No large fish are found in Redberry Lake and it is reported that local Cormorants and Pelicans do their fishing on Gordon Lake, fourteen miles to the north.

WHITE PELICAN—A small colony is reported to nest on a rocky island near the east shore of the lake.

MALLARD, SHOVELLER, BALDPATE.—Surface-feeding ducks were not common and most of those seen were nesting females flushed from several marshy sloughs adjacent to the lake. The lake margin itself is nearly bare of aquatic vegetation and seemingly unattractive to this class of water-fowl.

LESSER SCAUP.—Next to the White-winged Scoter this was the commonest duck on the lake; two bands, chiefly drakes, estimated at 250 in all, being observed. Mated pairs frequented the sloughs mentioned above in connection with surface-feeding ducks.

WHITE-WINGED SCOTER.—At least 500 seen at different points of the lake. These were in pairs or small bands, some resting on the water others circling the lake high in the air. The centre of abundance was in the vicinity of two wooded islands which undoubtedly were nesting grounds for this species.

CANADA GOOSE.—Mr. Martin reported that not more than two or three pairs nested in the vicinity. In the autumn geese assemble on the lake in large flocks, and, as Redberry Lake remains open longer than is the case with other lakes in the vicinity, the region has become noted for its goose-shooting.

WESTERN WILLET.—Not observed on the lake shore. One pair seen beside a slough a short distance inland.

MARBLED GODWIT.—More common than the last, three being seen on the lake shore, and several pair beside one of the inland sloughs.

WILSON'S PHALAROPE.—Twelve individuals observed on the slough mentioned in connection with the Black Tern.

GREAT BLUE HERON.—Reported to be nesting in poplar trees on an island close to the west shore of the lake.

KILLDEER.—Four seen at different points on the lake.

SPOTTED SANDPIPER.—One individual heard at the north end of the lake.

The following land birds were observed. (The scarcity of Buteos, in a country densely populated by ground squirrels, is notable).

Prairie Sharp-tailed Grouse, 6; Ruffed Grouse, 7; Mourning Dove, 7; Western Redtail, 1; Swainson's Hawk, 1; Boreal Flicker, 4; Desert Horned Lark, 2; Kingbird, 20; Western Meadowlark, 50; Brewer's Blackbird, 30; Bronzed Grackle, 10; Crow, 15; Thick-billed Redwing, 4; Cowbird, 4; Baltimore Oriole, 1; Dakota Song Sparrow, 5; Vesper Sparrow, 20; Savannah Sparrow, 4; Baird's Sparrow, 3; White-rumped Shrike, 1; Cedar Waxwing, 5; Western Warbling Vireo, 2.

QUILL LAKE, SASKATCHEWAN

The Quill Lakes, slightly over one hundred miles north of Regina, are famous as a resting place for migrating water-fowl. Enormous flocks of ducks, attracted by the adjacent grain fields, linger in the autumn, and, when molested, find security on the broad reaches of the lake. This district is a resort well known to hunters.

As a nesting ground for ducks, however, it is of less importance. The water is strongly alkaline—cattle will not drink it—and the marsh growth about the shores of the main lake is com-

posed almost entirely of coarse triangular-leaved plants belonging to the *Cyperaceæ* group. Such fresh-water plants as bulrush, bog-rush and phragmites, which produce the lush growth so favoured by nesting diving ducks, are entirely absent except along the so-called "creek", which will be referred to later. Practically all the lands adjoining the larger lake formerly were lake bottom, consequently the soil is impregnated with alkali and supports but a scant vegetation. Perhaps the most valuable nesting areas for marsh birds are situated at the east end of Little Quill Lake and along the nearby Duck Hunting Creek where extensive sedge-marshes stretch some distance back from the shore.

In July, 1924, and July, 1926, the lake level was low and portions of the shore, that during a season of high water might be favoured by waterfowl, then offered little attraction. The shore area lying to the north of Dafoe was found to comprise an alkaline flat more or less covered with low sedges and short, wiry grasses of various species. In years of normal rainfall much of this land is boggy—so I was informed—but at that time one could walk dry shod to a beach of hard mud covered with an alkaline efflorescence. Along the shores of a narrow inlet scattered clumps of sedge were growing and here Marbled Godwits, Western Willet and Lesser Yellowlegs appeared fairly common; a Wilson Phalarope flushed from his nest containing four eggs, and several other Phalaropes were seen in flight. Such passerine birds as Savannah Sparrows, McCown's Longspur, Chestnut-collared Longspur and Western Meadowlarks were present in fair numbers and the song of Sprague's Pipit came from high above us.

Lands at the north end of the lake in Township 35.17.W.2. are similar except that the lake margin is all more or less boggy with occasional straggling beds of the coarse sedge before mentioned, this growth reaching its maximum on two long boggy peninsulas. One such area was occupied by a vagrant band of Franklin's Gulls—apparently this species does not nest in the vicinity. Marbled Godwit and Western Willet, here as elsewhere on the lake shore, could be called fairly common. The only other water-fowl encountered were drake Redheads in several small flocks.

Lands bordering the narrow channel which connects the two lakes are at a slightly higher elevation but covered by the same type of vegetation with the addition of several poplar bluffs. Here we saw a small band of drake Canvas-back, one Eared Grebe and several Lesser Scaup but no evidence of nesting ducks could be found.

Possibly the most interesting nesting grounds are the several low, rocky islands which may be seen from various points along the west shore—unfortunately I was unable to explore them on either of my trips to the lake. Double-crested Cormorants crowded the shores of one island and from another rose a number of Pelicans. Undoubtedly these birds were nesting and in such isolated situations will not suffer from animal predators. It is reported that various species of ducks also nest on these islands.

The "Creek" before referred to extends from the south west corner of the lake in a south westerly direction for a distance of seven or eight miles. Near the point where it joins the lake the water is fairly deep and the shores are bare. Here it is crossed by a bridge and on the railings and posts of this structure it is common to see both Marbled Godwits and Western Willets during the breeding season. In July, 1926, broods of Canvas-back and Lesser Scaup were plentiful, far more so than was the case in 1924. A short distance from the lake the channel becomes a narrow, shallow slough, or rather, a succession of sloughs—the intervening areas holding water only during the wet season. Marsh growth along this entire entire depression is more luxuriant than elsewhere —possibly the water here is less alkaline than is the case with the main lake. Much of the channel was dry at the time of my last inspection in July, 1926, but the vegetation of sedges, marsh grasses and some bog-rush was still vigorous.

BEAVER HILL LAKE, ALBERTA

Beaver Hill Lake, lying some fifty miles east of Edmonton, is one of the most important duck shooting areas of central Alberta and is visited during the open season by sportsmen from Edmonton, Camrose, Vegreville, Lamont and other towns in the district.

The lake is fairly deep, and, although the water is alkaline, weed growth such as *Potomogeton perfoliatus* and *Potomogeton pectinatus* is general in all the shallow portions while various species of molluscs are found in abundance. I was informed that pike, ling and mullet are plentiful although little fishing is done in this lake. The surrounding country is either flat or slightly rolling, parts of the unbroken prairie are sparsely dotted with clumps of willow and poplar, other portions are quite open. Much of the land has been brought under cultivation, the soil being of good quality particularly around the southern portion of the lake. Towards the north end the soil is lighter and there is more virgin prairie. Good crops of slough hay are taken off the wet land close to the lake. The shore line at high water is of two

different types—hard sand and gumbo covered with short grass, and marsh land. The latter is of the type usual in this district—bog-rush on the outer portion and sedges on the land side. There are also isolated beds of bulrush. In September, 1922, both the marsh areas and the grass and sand beaches were encircled by a wide flat of gumbo baked and cracked by the sun on the dryer portions.

While inspecting the vacant lands adjoining the lake I was camped from September 12th to 16th on the east side twelve miles from Tofield. On this side are several narrow arms of the lake extending inland for some distance. These were partly dry and the wide belts of bog-rush on either side, fringing the water's edge at high water, were high and dry. The water area was covered with a matted growth of Potomogetons. Large numbers of Mallard, Green-winged Teal, Blue-winged Teal, Shoveller, Gadwall and Pintail were present on these shallows at all times of the day and Black-bellied Plover, Pectoral Sandpiper, Baird's Sandpiper and Dowitcher were numerous on the mud flats. Marbled Godwits and most of the Western Willets, both common summer visitants had departed. Four Sandhill Cranes appeared on September 13th and remained in the vicinity for several days. The migration of Savannah Sparrows was at its height, every weed patch swarmed with them; tule beds were occupied by Nelson's Sparrow and Prairie Marsh Wrens and everywhere on the stubble Lapland Longspurs were common.

Portions of the main lake were fairly crowded with ducks—long rafts of birds massed against the horizon. Many were Mallard and these came into the stubble to feed in the evening. Although these birds were shot at constantly in the fields they frequently alighted after sunset two hundred yards or less from the gunners. During my visit ducks were constantly passing backward and forward from the main lake to the marshy areas and good shooting could be had at almost any point on the intervening land. I visited this section again on September 27th and 28th and completed my investigations. During my absence the numbers of ducks frequenting the lake and adjacent sloughs had at least doubled. Hutchin's Geese also were plentiful, about six hundred in all being seen on the morning of September 28th.

The island which occupies portions of Sections 16, 17 and 21, 17, W 4, is in the centre of one of the most important flight lines and in all probability better shooting is to be had there than on any other portion of the lake. To the west of the island and separated by only a few yards of shallow water a series of sand bars have been uncovered and these we usually found crowded with ducks of various species. A large flock of Canada Geese also was seen there on several occasions. The narrow channel (less than 50 yards in width in some places) which separates the island from the mainland on the south side provides wonderful shooting during the morning and evening flight. Owing to the dry seasons the island is now of larger area than indicated on the Township Map of 1917 and a small portion, formerly lake bottom extends into the south-west quarter of Section 16. The island is similar in topography to the adjacent mainland, that is, flat prairie with a few scattered poplars, these being on the central ridge. The beach is more or less sandy and the lake bottom in the channel hard enough to permit cattle to cross at low water. A large club house has been built by the Northern Shooting Club near the west end of the island and this is usually occupied by the members for the greater portion of the shooting season. There is a considerable growth of hay on the island and I understand it was formerly leased for grazing purposes.

The south half of legal subdivision 4 in Section 16, 51, 17, W 4, is open hayland close to a marshy arm of the lake which is now dry. This is on a direct flight line and also of great value for shooting purposes.

The fractional north-west quarter of Section 34, 50, 18, W 4, is practically all a marsh of bog-rush with a narrow strip on the southern portion grown up with coarse sedges and slough hay. The bottom is hard and one can wade through the rushes to open water without difficulty. The shore line of the adjacent sections is similar. A mile to the north is Francis Point, famous for its duck-shooting; a long, sandy, grass-covered peninsula which extends westward for several miles, then south about half a mile, and forms the north shore of a sheltered bay. The greater portion of the shore line on the east and south of this bay is marshy and ducks frequent this part of the lake in large numbers to feed on the Potomogeton beds. This fraction therefore can be regarded as one of the best vacant parcels adjoining the lake.

Francis Point was visited on September 27th. On this day a stiff gale blew from the south-west and ducks had congregated in great flocks in the lee of the peninsula where the water was quiet. A flock of Hutchin's Geese were seen feeding on the north side high up on the beach and about fifty Golden Plover were also noted. I spent several hours on the point during the afternoon and it was observed that ducks were constantly flying across while at other points of the lake little

movement amongst the ducks was noted except during the morning and evening flight. Mallard had already begun to fly into the stubble fields on the base of the peninsula when I passed through that portion about 4.30 p.m. on my way back to Tofield and looking westward towards the end of the point it was noticed that the number of ducks crossing this narrow strip of land had greatly increased. The following morning I was on the south side of the bay where a large number of Canada and Hutchin's Geese were present in scattered flocks along the wide beach. When these flocks were put up they flew directly north across Francis Point and pitched in the lake on the north side.

(To be continued)

CYRIL GUY HARROLD

THE tragic death of C. G. Harrold in New York City due to meningitis following an attack of influenza, brings to a premature close, the career of a man of extraordinary ability as an ornithologist, just as he was entering the most important phase of his life.

Cyril Guy Harrold was born at Lapford, Devonshire, England, on August 5th, 1895. His early education was received at Risley Latin School, Derbyshire (1905-1908) and from there he went to Trent College, Long Eaton, Derbyshire (1908-1913). From an early age, his interest in birds manifested itself, fostered and developed by his Natural History master at Trent, of whom he often spoke in terms of affection. He was curator of the college museum from 1910-1913 inclusive, collecting continuously during this period and developing into an expert preparator. He was a member of the Officers Training Corps at Trent and became a crack shot which earned him a place on the team winning the "Country Life Cup" shoot in 1912. He came to Canada in April, 1914, and took up farming at Copetown, Ont., and on the outbreak of war he found that defective eyesight kept him out of the combatant forces. He did his "bit" for the duration of the war at the hazardous work of manufacturing explosives. All his spare time was spent in bird study and collecting and in 1919 he came to Winnipeg to reside. By this time he had definitely settled on ornithology as a career. Between collecting trips he was on the staff of the late E. W. Darbey, Taxidermist, later forming the Western Taxidermists in partnership with Horace Hatton.

Harrold was far more than a collector, he was a keen student of systematic ornithology and his knowledge of Latin, French and German stood him in good stead. The theoretical side of the study also engaged his close attention, particularly the pigmentation and structure of feathers, and the problems of migration and distribution. No one, with similar interests, could be very long in his company without being greatly stimulated and inspired by his quiet enthusiasm, and his unusual powers of observation were a constant source of admiration to his friends. The speed with which his knowledge developed during the years 1921-1928 was truly amazing, so much so, that when his contacts with other ornithologists in Canada had extended from the Atlantic to the Pacific, there was not one of us, amateur or professional, who failed to recognise, that as a field ornithologist he was without a peer.

The field wizardry to which he had attained is well illustrated in the following story. One May day in 1925 when he was collecting for the National Museum of Canada at Whitewater Lake, Man., we were just sitting down to lunch when Harrold jumped to his feet and said "There is a Peregrine coming." The camp was surrounded by trees and the lake shore was not visible. All I had heard was the call of a Red-winged Blackbird from some 400 yards away. This was quickly followed by a growling caw of a crow. "Yes, it's a Peregrine all right," he said, and then I saw through the trees, the flashing form of the hawk. Catching sight of our tent, it swung towards it and was promptly collected by Harrold, the specimen incidentally proving to be in a most interesting plumage, hardly separable from a Prairie Falcon. "How did you know the Peregrine was coming?" I enquired. "The Red-wing told me and the crow confirmed it," he replied. I found he could interpret the meaning of fifteen different calls of the crow and many other incidents could be related showing the remarkable powers of reading the meaning of sound or behaviour which he possessed. Tall and powerful in build, he was tireless in the field. I have seen him wade the marshes and roam the prairie from daylight to dark and then prepare specimens all night. This would not be just an occasional spell, but a regular programme two or three times a week when migration was at its height and specimens had to be secured and put up without delay. Dr. H. S. Swarth, commenting on the collection brought from Nunivak Island in the Bering Sea, said "It is the finest collection ever brought out of the Arctic by one man as a result of one season's work."

At the time of his death, he was busy preparing the details of an expedition to Madagascar under the joint auspices of the American Museum of Natural History, the British Museum and the Paris Museum. He had completed a check list of Madagascan birds, with notes on habitat, etc., which he had translated from the French, and arranged the Madagascan material in the American Museum when he went down under an attack of influenza. This developed trouble in his ears and on February 1 he was operated on for mastoiditis. It was found, however, a more serious infection (meningitis) had also gained hold and he failed to rally after the operation. He died at 2.15 a.m. on February 4th.

Harrold has greatly added to our knowledge of western bird life. In 1921 he collected at Gimli, Man., (April 12 to June 4), securing such rarities for the province as Old Squaw Duck, May 2; Hudsonian Curlew, May 21; Scarlet Tanager, May 30. The spring of 1922 saw him at Lake Johnston, Sask., where he secured the following first records for the province: Duck Hawk, May 2; Grasshopper Sparrow, May 16; Townsend's Solitaire, May 10. Amongst the rare species for Saskatchewan we find: Stilt Sandpiper, Buff-breasted Sandpiper, Brewer's Sparrow, Black-headed Grosbeak and Blackburnian Warbler. The spring of 1923 and the fall of 1924 and 1925 he collected at Beaverhills Lake, Alta., part of the time in company with Prof. Wm. Rowan of Alberta University. They were collaborating in the preparation of an annotated check list of birds of Beaverhills Lake, which task Rowan will now complete alone. Three spring seasons were spent at Whitewater Lake, Man., April 23-June 2, 1924; April 2-June 10, 1925; April 8-May 7, 1926. The 1925 season at Whitewater was in the interests of the National Museum of Canada and the summer of that year he collected with P. A. Taverner in the Red Deer Valley and Badlands of Alberta. The summer of 1926 was spent at Belvedere, Alta., in company with P. A. Taverner and Hamilton M. Laing for the same institution. The summer and fall of 1927 found him in the Aleutians and on Nunivak Island for the California Academy of Sciences. The results of this trip called forth high praise from Dr. H. S. Swarth who published the outstanding records on July 10, 1928, "Occurrence of Some Asiatic Birds in Alaska" (Proc. of the California Acad. of Sci.) They are: the Japanese Pipit, Middendorff's Grasshopper Warbler and an Accentor—*Prunella montanella* (Pallas)—all first records for North America, the last mentioned representing not only a new species but a new family and genus as well. The Mongolian Plover and Cassin's Bullfinch were rediscovered after a lapse of over fifty years. Harrold's last field trip was to the north shore of the Gulf of the St. Lawrence—the Canadian Museum. Here he came in contact with Dr. H. C. Oberholser, Dr. Glover M. Allen, Francis H. Allen and Frank H. Kennard. These gentlemen were not slow to recognise Harrold's ability and as soon as he was free, he was engaged by the Museum of Comparative Zoology, Harvard College, Cambridge, Mass. No sooner had he accepted this offer than he was approached by the American Museum of Natural History to accompany their Madagascan expedition as ornithologist. The Museum of Comparative Zoology authorities kindly waived their prior claim, to let him go. He now devoted himself, with his accustomed zest and energy, to mastering Madagascan ornithology from the literature and specimens available at the American Museum and he had completed this task when death claimed him just five days before the expedition was due to sail. It will be a difficult task to replace him, and, in the hearts of his friends, an impossible task.

In addition to a number of press articles chiefly on Shore birds, Harrold published two scientific papers: "An Outline of the Natural Selective Absorption of Radiant Energy" (*The Auk*, April, 1925, in collaboration with B. W. Cartwright) and "Notes on the Lesser Snow and Blue Geese observed at Whitewater Lake, Manitoba" (*The Auk*, July, 1928). Two popular articles "With the Eskimos at Nunivak" and the "The Whaling Station at Akutan" will appear in *Country Life* (England) in the near future.

He became a member of the Natural History Society of Manitoba in 1920, and an Associate of the American Ornithologists' Union in 1924.

In manner, Harrold was shy and reserved, always keeping himself in the background but always courteous and willing to share his knowledge with others. He possessed a keen sense of humour and would enter into a practical joke with all the zest of a school-boy.

As an ornithologist, he had that within him which would have made him pre-eminent; as a man, he was all that is encompassed by the word Gentleman. In the many letters received by P. A. Taverner and the writers, this is the word most frequently used to describe him. We cannot conclude this tribute more fittingly—Cyril Guy Harrold was an ornithologist and a gentleman.
—B. W. CARTWRIGHT and A. G. LAWRENCE.

BUTTERFLIES OBSERVED IN THE SUDBURY DISTRICT, ONTARIO

By E. D. KINDLE

THE specimens on which the following list is based were collected during the months of July and August, 1927 and 1928, while the writer was a member of a Dominion Geological Survey party. The collection was made not far from latitude 46° 30′ in a region of undulating hills and valleys which have been robbed of their forest growth by successive fires. This region lies approximately 100 miles east of Lake Superior and has an average elevation of about 900′ above the sea. The valleys between the rock-ribbed hills have attracted settlers in recent years and in their hay fields on the bright sunny days, butterflies appear in numbers. The Banded Purple and the Mourning Cloak represent the more common species met with. Most of the specimens were taken near Worthington, 25 miles west of Sudbury. A few were collected at Espanola, 15 miles farther west. The list is far from being a complete record of the butterflies in the Sudbury area but serves as an index of the more common species.

Papilio turnus canadensis R. & J. (The Tiger Swallowtail).

Eurymus interior Send. (The Pink-edged Sulphur).

Enodia portlandia Fabr. (The Pearly Eye.)

Satyrodes canthus L. (The Common Grass-nymph).

Cœnonympha inornata Edw. (The Plain Ringlet).

Satyrus alope nephele Kirby (The Clouded Wood-nymph).

Argynnis atlantis Edw. (The Mountain Silver Spot).

Phyciodes tharos Dru. (The Pearl Crescent).

Polygonia faunus Edw. (The Faun).

Aglais j-album Bdv. & Le Con. (The Compton Tortoise).

Aglais milberti Godart (Milbert's Tortoise-shell).

Aglais antiopa L. (The Mourning Cloak).

Basilarchia arthemis Dru. (The Banded Purple).

Heodes hypophlæas Bdv. (The American Copper).

Plebeius sæpiolus Bdv. (The Greenish Blue).

Epargyreus tityrus Fabr. (The Silver Spotted Skipper).

Cocceius pylades Send. (The Northern Dusky-wing).

Polites peckius Kirby (Peck's Skipper).

Poanes hobomok Harris (The Hobomok Skipper).

It is interesting to note the absence from this list of two of the most widely distributed butterflies. Neither the Monarch (*Danais archippus* Fabr.) nor the Painted Lady, (*Pyrameis cardui* L.) were observed during the two seasons spent in the area. According to Holland (1898) the Painted Lady or Thistle Butterfly is found wherever the thistles grow, all over Europe, North America, in far off Australia and in many of the islands of the seas.

The Monarch butterfly is one of the few insects which migrate in large flocks. There are many interesting records of these migrations. Bradshaw in the Ottawa *Naturalist*, 1907, reports it, under the name of the "Milkweed Butterfly" to have appeared overnight at Morden, Manitoba. In the morning they were in such numbers and clustered together so closely on the trees on which they had settled that the trees appeared as a blaze of red. Hutchings, (*Can. Field-Naturalist*, 37: 150) tells of a migration which he observed at Toronto in August, 1903. He says: "They were so numerous and clustered so heavily on the branches that the effect was to impart a bright red tint to the leaves."

Argynnis atlantis Edw. and *Papilio turnus canadensis* R. &. J. which were frequently seen in the Sudbury district have apparently a wide range in Eastern Canada. They are recorded in the list of Butterflies taken in the interior of the Labrador Peninsula (Annual Report of the Geological Survey, 1895).

For the identification of several species, I am indebted to the Entomological Branch, Department of Agriculture, Ottawa.

FIELD WORK OF NATIONAL MUSEUM OF CANADA, 1929

By W. H. COLLINS, Acting Director

TWELVE field parties will be engaged in field work for the National Museum of Canada this summer. Five of these will be engaged in biological work, six in anthropology and archæology, one in mineralogy and one in palæontology. Two parties will be chiefly occupied in collecting specimens, but the others combine collecting of specimens with the study of problems of scientific interest. Contributions to the Museum will also be made by the Geological Survey, with which the Museum is closely associated. The Geological Survey will

have fifty-two parties distributed throughout Canada, and, although these parties will be concerned mainly with problems and work of an economic nature, they will, incidentally, gather material and information for the Museum.

ANTHROPOLOGY

D. JENNESS will make a general ethnological study of the Indians around Georgian bay on Manitoulin island.

C. M. BARBEAU will resume, for the season of 1929, an investigation of the social organization, history, traditions, privileges, hunting grounds and other phases of civilization of the Tsimshian Indians of the Nass River region, British Columbia. He will also study the language and collect the songs of these tribes.

H. I. SMITH will study and collect ethnological material from the Kwakiutl and Nootka tribes of Vancouver island, in continuation of his work last year. He will also take motion pictures of representative activities among these people, and if practicable, of the Haida Indians of Queen Charlotte islands and the Blackfoot Indians near Gleichen, Alberta.

J. C. BOILEAU GRANT, Professor of Anatomy in the University of Manitoba, is undertaking for the National Museum a thorough examination of the Indians along Peace river, between the end of the railway and Hudson Hope. Besides making a complete series of physical measurements of both adults and children, he will carry out some blood tests, with the co-operation of the Department of Health, to investigate the theory that the Indians separated from the rest of the human race before the human blood underwent the two mutations that seem to have occurred in the Old World.

C. B. OSGOOD who went last summer to the lower Mackenzie river, in the vicinity of Fort Norman, to study the social and economic life, the religion and the traditions of the little known Hare and Mountains Indians, has spent the winter in this field and will not return until September, 1929.

W. J. WINTEMBERG will continue an exploration of ancient village sites and other remains along the north coast of the Gulf of St. Lawrence with a view to determining the time and areal relationships of occupation of this region by the Iroquois, Eskimos and the extinct Beothuk people.

ZOOLOGY

R. M. ANDERSON and HAMILTON M. LAING will continue studying and collecting mammals in southern British Columbia in the region near the International Boundary line from Okanagan lake eastward to Alberta. This is continuation of the work carried out by Mr. Laing in 1928 and by Mr. Laing and C. H. Young in 1927. This region is of particular biological interest because of the extraordinary and sharply defined variety of climatic and topographic conditions that occurs from east to west and because it differs also in these respects from the country to the north, and these differences are reflected in the fauna and flora. Birds and other animals will also be collected.

P. A. TAVERNER will accompany the Canadian Government SS. *Bœothic* on the annual trip to Greenland and the Canadian Arctic region. At points of call he will collect birds and other zoological specimens, obtain information on points of scientific interest in these regions, and arrange with local residents for them to collect further desired material for the Museum.

JOS. ROCHON, osteological preparator, will probably spend about a month in the early fall collecting small mammals not far from Ottawa.

C. L. PATCH, J. ROCHON, C. E. JOHNSON and D. BLAKELY will collect specimens and accessories locally for use in the habitat groups which are being prepared.

BOTANY

M. O. MALTE and J. B. WATSON will continue from 1927 a systematic botanical survey of New Brunswick.

HUGH M. RAUP will continue a botanical survey of parts of Wood Buffalo Park, south of Great Slave lake which he began in 1928. With the co-operation of the Northwest Territories and Yukon Branch, Department of the Interior, he will investigate the forage plants and range conditions in certain areas in the Park.

GEOLOGY

The section of geology in the Museum is maintained entirely by the Geological Survey, which will have fifty-two parties in the field this season. Incidentally to the practical operations upon which these parties will primarily be engaged, it is anticipated that, as in former years, they will enrich the collections and records of the Museum.

MINERALOGY

The Geological Survey also contributes to the sections of mineralogy and palæontology, but in addition special collecting parties are also sent out. This year A. T. MCKINNON will collect mineral specimens in the Maritime Provinces, Quebec, and Ontario. Some of the material is intended for addition to the Museum collections

but a large quantity will be secured for making special collections, several hundreds of which are distributed yearly to educational institutions, mining companies and prospectors.

E. POITEVIN will investigate mineralogical problems and collect specimens from the serpentine-asbestos belt of southern Quebec.

PALÆONTOLOGY

C. M. STERNBERG will collect fossil remains of dinosaurs and other extinct vertebrate animals from the Cypress hills, in the southeastern part of Alberta.

NOTES AND OBSERVATIONS

THE WATER SHREW (*Sorex palustris*) IN ONTARIO.—This species has not been reported very often from Ontario, either because of its rarity, local distribution, or elusive habits. The species, under five subspecific varieties, ranges in Canada from the Atlantic to the Pacific. The Acadian water shrew, *Sorex palustris gloveralleni* (Jackson), inhabits Nova Scotia (including Cape Breton Island), New Brunswick, and the Gaspé Peninsula of Quebec, and the Mountain Water Shrew, *Sorex palustris navigator* (Baird) is found from the Rocky Mountain region to the Pacific coast. Three other forms occupy the intermediate region, their extremes focussing and intergrading in central and western Ontario. Two other species of this group have been described from southern Alaska, but are not known to occur in Canada.

Dr. Hartley H. T. Jackson, in his recent classic work,[1] relegates the old name *Neosorex* to subgeneric rank, and on his map (fig. 21, p. 177) showing "Geographic range of species and subspecies of the *Sorex palustris* group" indicates a broad No-man's-land in western Ontario, north of Lake Huron and east of Lake Superior, where three subspecies, the white-chinned water shrew *Sorex palustris albibarbis* Cope, on the east; the Richardson water shrew, *Sorex palustris palustris* Richardson, on the west; and the Wisconsin water shrew, *Sorex palustris hydrobadistes* Jackson, on the southwest, presumably come together and intergrade. *Sorex palustris hydrobadistes* is not definitely recorded from Ontario, but Jackson states (1928, p. 180) that "It intergrades with *S. p. palustris* in northern Minnesota, and probably also with *albibarbis* in the Great Lakes region of southwestern Ontario, though material examined from that region has been insufficient to establish this point." Jackson has recently examined two of the three specimens taken by J. D. Soper at Ridout, Sudbury district, in 1918, and states (in letter, 14 Feb., 1929): "The two from Ridout are somewhat intermediate between *Sorex palustris palustris* and *Sorex p. hydrobadistes*, approaching *hydrobadistes* in the flatness of the crania and in size. On the whole, however, the specimens are nearer *Sorex palustris palustris*."

One specimen found dead by J. F. Calvert on railway track through low land near Scotia Junction, Parry Sound County, between Georgian Bay and Algonquin Park in 1928, the most southern record of the species in Canada, and another taken by R. M. Anderson in 1926, in low, marshy spot at edge of Blue Sea Lake, Quebec, about 70 miles north of Ottawa, were at the same time definitely referred to *Sorex palustris albibarbis*. G. H. Miller[2] states that "The marsh shrew is rare at North Bay, but tolerably common at Pensinsula Harbor. I did not find it at Nipigon. This shrew is always found in or near thick woods and in the wettest situations, generally near the bank of a stream. At Peninsula Harbor I trapped several in vole runways at the edge of a wet caribou meadow." Jackson (1928, p. 185) refers the North Bay specimen to *albibarbis*, marking the most western definite record of this form; the Peninsula Harbor specimens are probably referable to *Sorex p. palustris*. Jackson (1928, p. 179) provisionally refers a skull from Michipicoten Island, Lake Superior, to *palustris*. W. E. Saunders also has taken a specimen at Rossport, on north shore of Lake Superior. The only other Ontario records, available are six taken by Morris M. Green in June, 1924, at Franz, the junction of Canadian Pacific with Algoma Central Railway northeast of Lake Superior, on bank of alder-lined brook; and one on brookside near culvert at Minaki on Canadian National Railway in extreme western Ontario. These later records are undoubtedly referable to *S. p. palsutris*.

The water shrew is a very beautiful little mammal with its soft, dense, black or silvery fur, and if its size were commensurate with its texture and beauty the pelt would probably compete in value with the sea-otter. Its habits are secretive and during several season's field work where the animal is found, the writer has never caught a glimpse of a living specimen. The animal's progress in the water is said to resemble that of a

[1] A Taxonomic Review of the American Long-tailed Shrews (Genera *Sorex* and *Microsorex*), North American Fauna, No. 51, Washington, 1928, pp. 1-228.

[2] "Notes on the Mammals of Ontario," Proc. Boston Soc Nat. Hist., Vol. 28, 1899 p. 34.

silvery torpedo. The propulsive power in the water is greatly aided by a fringe of stiff silver hairs along the edge of toes of hind feet. While it is possible that the species may be fairly common in some favourable localities, it is probably very local. Miller did not find it at Nipigon, and the extensive work of expeditions from the Royal Ontario Museum of Zoology in the Lake Nipigon and Lake Abitibi regions did not find a trace of water shrews. C. H. Young and the writer also trapped unsuccessfully for several weeks in north-eastern New Brunswick, making especial efforts to obtain the water shrew, although several were ultimately obtained in one small brook.

Most of the specimens (*Sorex palustris gloveralleni* Jackson)[3] captured in Nova Scotia, New Brunswick, and Gaspé Peninsula, Quebec, were taken in sets placed on small, nearly submerged rocks, or at the water's edge on partly submerged logs, in swift-running brooks in heavy forests. In such situations the small metal traps were most satisfactory as a light shower often raised the small brooks a few inches and swept away the traps. Wooden-base traps should be tied fast in any event. The most attractive bait was a bit of fresh fish. A few specimens have been taken in runways on edge of woodland swamps or lakesides, and the animals have not disdained a combination bait of strong cheese, bacon grease, peanut butter, and other combinations, sometimes scented with tincture of valerian. Like most shrews, the water shrew is probably both insectivorous and carnivorous, and a fierce and active hunter although of diminutive size.

A careful study of the life history of any of the geographical races of the water shrew, or even brief contributions along this line, would be of great interest. From the standpoint of the systematist it would be very desirable if some Canadian field naturalist would obtain specimens from the region around Sault Ste. Marie, east of Lake Superior and adjacent to North Channel of Lake Huron. The Wisconsin water shrew (*Sorex palustris hydrobadistes*) is known to occupy the northern peninsula of Michigan, and it is desirable to establish the definite occurrence or non-occurrence of this form in Canadian territory.—R. M. ANDERSON, National Museum of Canada, Ottawa.

SOME LITTLE BROWN BATS FROM ONTARIO.—The following list of specimens of little brown bats in the collection of the Royal Ontario Museum of Zoology is published as a contribution to our knowledge of the occurrence and distribution of the genus *Myotis* in Ontario. These specimens were recently identified for us by Dr. Glover M. Allen.

Myotis l. lucifugus (LeConte). Coldstream, Middlesex Co. 8 specimens (A. A. Wood); Vineland, Lincoln Co. (J. Feygt); Toronto (D. H. Hamly); De Grassi point, Simcoe Co., 2 specimens (Dr. E. M. Walker); Hawkestone, Simcoe Co. (D. H. Hamly); Wasaga beach, Simcoe Co., 2 specimens (Dr. P. Harrington); Londesborough, Huron Co. (K. L. Hamilton); McGregor bay, Manitoulin dist. (Prof. B. A. Bensley); Macdiarmid, Thunder bay dist. 3 specimens (J. R. Dymond, E. B. S. Logier, J. L. Baillie).

Myotis keenii septentrionalis (Trouessart). Wingham, Huron Co. (Miss F. Haines); Lake Kahsha, Muskoka dist. (Dr. E. H. Craigie); Bear island, Lake Timagami, Nipissing dist. (Prof. A. F. Co. ventry).—J. R. DYMOND.

WESTERN RAGWEED FARTHER EAST.—In *The Canadian Field-Naturalist* for December, 1927, page 202, I recorded Western Ragweed (*Ambrosia psilostachya* DC.) from a number of Ontario localities, and from Chicoutimi, Que., apparently much the farthest east Canadian station known. Subsequently I learned from Mr. Harrison F. Lewis that he had collected it on September 1, 1927, on rubbish heaps at Harrington Harbour, Saguenay Co., Que., which may safely be regarded as the farthest east record for the continent. On June 20, 1928, I also found a small colony of this perennial rooted Ragweed growing near farm buildings at South Berwick, N.S., so far as I know, the only maritime province station.—HERBERT GROH.

BIRD BANDING RETURNS—TWO CORRECTIONS.—The birds, reported as European Widgeon No. 386421, on page 67 of *The Canadian Field-Naturalist*, for March, 1929, and European Widgeon No. 601079, on page 89 of *The Canadian Field-Naturalist* for April, 1929, were Baldpates, and should have been so recorded. The error arose through the use by the bander of the local name "Widgeon" for the species Baldpate of the A.O.U. check list."

SOME AMPHIBIANS OF WESTERN NORTH AMERICA.—On November 23, 1922, the California Academy of Sciences issued two volumes under the title, "Occasional Papers of the California Academy of Sciences, X, The Reptiles of Western North America," by John Van Denburgh. On September 15, 1928, the Academy issued a volume entitled, "Occasional Papers of the California Academy of Sciences, XVI, The Amphibians of

[3]The original name *Neosorex palustris acadicus* G. M Allen, 1915, being preoccupied by *Sorex acadicus* Gilpin. 1869, which is considered a synonym of *Sorex cinereus* Kerr, 1792.

Western North America, An Account of the Species Known to Inhabit California, Alaska, British Columbia, Washington, Oregon, Idaho, Utah, Nevada, Arizona, Sonora, and Lower California," by Joseph R. Slevin, Curator, Department of Herpetology.

The latter volume is dedicated to the memory of Dr. John Van Denburgh and in general character follows the plan of *The Reptiles of Western North America*. It includes descriptions of the amphibians of the same geographical area, and in a general way lists their distribution. Forty-six species and subspecies are admitted to the fauna of the area. Of these twenty-two are salamanders, and twenty-four are frogs, toads, etc. The forty-five illustrations have been made from original photographs of living amphibians.

The two volumes dealing with reptiles and this later volume on amphibians comprise an up-to-date review of the herpetology of the western portion of North America.

The volume on amphibians lists the following species and subspecies as occurring in British Columbia:

Triturus torosus
Ambystoma decorticatum
Ambystoma macrodactylum
Ambystoma paroticum
Dicamptodon ensatus
Plethodon intermedius
Aneides ferreus (insular)
Bufo boreas boreas
Hyla regilla
Rana aurora aurora
Rana pretiosa
Rana cantabrigensis,

The following list of specimens in the National Museum of Canada may be of interest as extending and making more definite the known distribution of certain amphibians:

Ambystoma macrodactylum, Banff, Alberta.

Plethodon intermedius, Ucluelet, Vancouver Island; Hope, B.C.

Scaphiopus hammondii, Okanagan Landing, B.C.; Keremeos, B.C.

Bufo boreas boreas, Jasper Park, Alberta; Banff, Alberta.

Hyla regilla, Armstrong, B.C.

Rana pretiosa, Jasper Park, Alberta.

—CLYDE L. PATCH.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS

Published by authority of the National Parks of Canada Branch, Department of the Interior, Canada

In the following returns upon banded birds it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Bird Act of Canada or the United States. The great majority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil, or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

RETURNS UPON BIRDS BANDED IN 1923.

COMMON CORMORANT, No. 204,740, nestling, banded by Harrison F. Lewis, one mile east of Cape Whittle, Saguenay County, Quebec, on July 17, 1923, was captured by a resident of Tracadie, New Brunswick, some time before March 26, 1928.

BLACK DUCK, No. 297,082, banded by Frank Thompson, at Spring Run Pond, Hancock County, Maine, on October 28, 1923, was killed at Little Aldouane, Kent County, New Brunswick, on October 4, 1928. Mr. Thompson reports this bird as a Red-legged Black Duck.

RETURNS UPON BIRDS BANDED IN 1924.

HERRING GULL, No. 312,271, yg., banded by Charles W. Townsend, at Grand Manan, New Brunswick, on July 14, 1924, was found dead at a place south of Cape Sable Island, Nova Scotia, during the month of August, 1927.

RETURNS UPON BIRDS BANDED IN 1925.

RAZOR-BILLED AUK, No. 368,670, ad., banded by Harrison F. Lewis, on Cliff Island, St. Mary Islands, Saguenay County, Quebec, on July 19, 1925, was found dead on the shore at Harrington Harbour, Saguenay County, Quebec, about the middle of August, 1928.

BLACK DUCK, No. 323,994, banded by H. S. Osler, at Lake Scugog, Ontario, on October 3, 1925, was shot at Cape Henrietta Maria, Ontario, on September 20, 1928.

BREWER'S BLACKBIRD, No. 260,628, ad. m., banded by P. S. Walker, at Point Grey, British Columbia, on March 4, 1925, was re-captured at the same station, on May 22, 1926, and was found dead in the same locality, on May 8, 1928.*

RETURNS UPON BIRDS BANDED IN 1926.

COMMON MURRE, No. 201,409, ad., banded by Harrison F. Lewis, on Boat Islands, Saguenay County, Quebec, on August 6, 1926, was killed at a place near but outside of St. Mary Islands Bird Sanctuary, Saguenay County, Quebec, in the autumn of 1927.

FRANKLIN'S GULL, No. 445,858, yg., banded by William Rowan, at Beaverhills Lake, Alberta, on June 25, 1926, was found in a field at Venturia, North Dakota, about August 8, 1928. The bird appeared to be dying.

FRANKLIN'S GULL, No. 449,899, yg., banded by William Rowan, at Francis Point, Beaverhills Lake, Alberta, on July 10, 1926, was found injured at Ypsilanti, North Dakota, on September 16, 1928. The bird was killed to put it out of its misery.

COMMON TERN, No. 434,325, banded by Charles B. Floyd, at Tern Island, near Chatham,

*C.F.N., XL, 1926, p. 162.

Massachusetts, on July 7, 1926, was found at Conway Grove, about two miles east of Rondeau Provincial Park, on the north shore of Lake Erie, Ontario, on August 18, 1928. The bird was exhausted and died later, the same day.

MALLARD, No. 418,372, banded by John Broeker, at Portage des Sioux, Missouri, on March 4, 1926, was shot at Windthorst, Saskatchewan, on October 5, 1928.

MALLARD, No. 456,172, banded by F. H. Rose, at Moiese, Montana, on October 17, 1926, was shot at Lake Johnson, 15 miles south of Moosejaw, Saskatchewan, on September 24, 1928.

BLACK DUCK, No. 457,716, banded by H. S. Osler, at Lake Scugog, Ontario, on October 9, 1926, was shot at Cape Henrietta Maria, Ontario, on September 20, 1928.

PINTAIL, No. 387,756, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on January 23, 1926, was shot on Crane Lake, 8 miles north of Piapot, Saskatchewan, on September 26, 1928.

BLACK-CROWNED NIGHT HERON, No. 368,426, fledgeling, banded by George Lang, at Indian Head, Saskatchewan, on June 12, 1926, was killed at Calhoun, Georgia, about October 5, 1928.

BLACK-CROWNED NIGHT HERON, No. 368,446, fledgeling, banded by George Lang, at Indian Head, Saskatchewan, on June 12, 1926, was shot on Section 3, Township 24, Range 25, west of the second meridian, Penzance, Saskatchewan, on September 15, 1928.

SWAMP SPARROW, No. A54,831, banded by Verdi Burtch, at Branchport, New York, on October 7, 1926, was found dead at Renfrew, Ontario, on May 2, 1928.

RETURNS UPON BIRDS BANDED IN 1927.

GREAT BLACK-BACKED GULL, No. 422,-181, juv., banded by Harrison F. Lewis, on Boat Islands, Saguenay County, Quebec, on July 26, 1927, was killed at a place near but outside of St. Mary Islands Bird Sanctuary, Saguenay County, Quebec, in the autumn of 1927.

GREAT BLACK-BACKED GULL, No. 422,-183, juv., banded by Harrison F. Lewis, on Boat Islands, Saguenay County, Quebec, on July 26, 1927, was killed at a place near but outside of St. Mary Islands Bird Sanctuary, Saguenay County, Quebec, in the autumn of 1927.

HERRING GULL, No. 568,871, banded by H. C. Wilson, at Sister Islands, Door County, Wisconsin, on July 5, 1927, was recovered—reported by a resident of Balaclava, Ontario, on September 21, 1928.

HERRING GULL, No. 422,189, juv., banded by Harrison F. Lewis, at Boat Islands, Saguenay County, Quebec, on July 26, 1927, was killed at a place near but outside of St. Mary Islands Bird Sanctuary, Saguenay County, Quebec, in the autumn of 1927.

HERRING GULL, No. 302,884, juv., banded by Harrison F. Lewis, on Cliff Island, St. Mary Islands, Saguenay County, Quebec, on July 27, 1927, was shot at Westport, White Bay, Newfoundland, on September 20, 1928.

CALIFORNIA GULL, No. 544,038, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 18, 1927, was found with a broken wing, on the bank of the Big Horn River, near Thermopolis, Wyoming, on October 25, 1927.

CALIFORNIA GULL, No. 544,090, yg., banded by Frank L. Farley, at Gull Island in Bittern Lake, twelve miles west of Camrose, Alberta, on June 21, 1927, was shot on a farm forty-five miles south and eleven miles east of Edmonton, Alberta, about August 15, 1927. The bird was thought to be a chicken hawk.

CALIFORNIA GULL, No. 544,139, yg., banded by Frank L. Farley, at Gull Island in Bittern Lake, twelve miles west of Camrose, Alberta, on June 21, 1927, was apparently recovered at Colonia Rivera, near Mexicali, Lower California, Mexico—reported on November 21, 1927.

CALIFORNIA GULL, No. 544,184, yg., banded by Frank L. Farley, on Gull Island in Bittern Lake, twelve miles west of Camrose, Alberta, on June 21, 1927, was shot forty-eight miles straight north of Lethbridge, Alberta, on the edge of a lake—reported on September 25, 1927.

CALIFORNIA GULL, No. 544,223, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was killed on Lac la Biche, Alberta, —reported on October 13, 1927.

CALIFORNIA GULL, No. 544,252, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead on the shore of Lone Pine Lake, Alberta, on September 17, 1927.

CALIFORNIA GULL, No. 544,277, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was killed at Lac La Biche, Alberta, on September 6, 1927. The bird was reported as a white gull.

CALIFORNIA GULL, No. 544,292, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found with a broken wing at a place three miles from the ocean near Palm City, California, on January, 3, 1928.

CALIFORNIA GULL, No. 544,304, yg., banded by Frank F. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot by a resident of Battle View, North Dakota, on September 26, 1927.

CALIFORNIA GULL, No. 544,324, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot on Lake McGregor, in the district of Milo, Alberta,—reported on October 13, 1927.

CALIFORNIA GULL, No. 544,348, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot near a slough, during the month of July, 1927,—reported by a resident of Armena, Alberta.

CALIFORNIA GULL, No. 544,363, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was killed by a chicken hawk, on April 5, 1928,—reported by a resident of El Centro, California.

CALIFORNIA GULL, No. 544,375, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead on the shores of Waterton Lakes in southern Alberta, directly north of Glacier Park, Montana,—reported on October 20, 1927.

CALIFORNIA GULL, No. 544,426, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found in a field at Balsac, Alberta, north of Calgary,—reported on January 28, 1928.

CALIFORNIA GULL, No. 544,482, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead on Jericho Beach, Vancouver, British Columbia, on October 2, 1927. The body of the bird had been recently washed up on the shore.

CALIFORNIA GULL, No. 544,484, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot in the rice fields near Gridley, California, on December 11, 1927. Shot in mistake for a hawk, and reported as a Black-backed Gull.

CALIFORNIA GULL, No. 544,492, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot at Red Willow, Alberta, —reported on August 29, 1927. Shot in mistake for a hawk.

CALIFORNIA GULL, No. 544,576, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead at the mouth of the Santa Marie River, Santa Barbara County, California, on December 14, 1927. The body was badly decomposed.

CALIFORNIA GULL, No. 544,591, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found at Square Butte Lake, about 8 miles west of Cascade, in Cascade County, Montana—reported on October 16, 1927.

CALIFORNIA GULL, No. 544,669, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead beside a lake,—reported by a resident of Redland, Alberta, on July 4, 1928. The bird had apparently been dead for a long time.

CALIFORNIA GULL, No. 544,672, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot by a resident of Bittern Lake, Alberta, on September 1, 1927.

CALIFORNIA GULL, No. 544,731, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead near Beck's Lake, about one mile south of Cody, Wyoming, on October 24, 1927. Had apparently been shot about two weeks before as the body was pretty well dried up.

CALIFORNIA GULL, No. 544,738, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was killed at Greenstreet Lake, about eighteen miles northeast of Lloydminster, Saskatchewan, on September 18, 1927.

CALIFORNIA GULL, No. 544,765, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead on the beach between Morro Bay and Caycus, California, on February 13, 1928. The bird was almost picked to pieces and had apparently been dead only a short time.

CALIFORNIA GULL, No. 544,782, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was killed with a shotgun, on the south side of Lesser Slave Lake, Driftpile Indian Reserve, Alberta, on August 14, 1927.

CALIFORNIA GULL, No. 544,790, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found at Gull Lake, Alberta, shortly before September 13, 1927. The bird had been washed up on the beach.

CALIFORNIA GULL, No. 544,791, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was killed on Boise River, about ten miles west of Caldwell, Idaho,—reported on October 2, 1927.

CALIFORNIA GULL, No. 544,852, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was picked up dead on the north shore of Flathead Lake, Flathead County, Montana, on September 14, 1927. The bird had been shot recently.

CALIFORNIA GULL, No. 544,863, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelves miles west of Camrose, Alberta, on June 22, 1927, was found with a broken wing, at Moon Lakes, Salt Lake County, on Utah Copper property, about five miles west of Salt Lake City, Utah, on August 31, 1928.

CALIFORNIA GULL, No. 544,871, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot at Needles, California, on November 21, 1927.

CALIFORNIA GULL, No. 544,908, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot on the shore of a small lake near Edgerton, about one hundred and fifty miles south-east of Edmonton, Alberta,—reported on September 26, 1927.

CALIFORNIA GULL, No. 544,921, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was killed on July 25, 1927, reported by a resident of Lac la Biche, Alberta.

CALIFORNIA GULL, No. 544,929, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found with a broken wing and killed at the edge of a slough, ten miles northeast of Calgary, Alberta, on September 16, 1927. The bird had probably been shot by a hunter the previous day.

CALIFORNIA GULL, No. 555,054, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 28, 1927, was killed on September 28, 1927, —reported by a resident of Meanook, Alberta.

CALIFORNIA GULL, No. 555,208, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 28, 1927, was caught by a resident of Molalla, Clackamas County, Oregon,—reported on January 4, 1928. When recovered, the bird had a broken wing.

CALIFORNIA GULL, No. 555,359, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 28, 1927, was found dead on a dry lake about twenty-five miles north of Barstow, California,—reported on December 27, 1927. The bird had probably been dead for a couple of weeks.

CALIFORNIA GULL, No. 555,387, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 28, 1927, was shot on Lake McGregor, in Township 18, Range 22, west of the 4th meridian, Alberta,—reported on October 10, 1927.

CALIFORNIA GULL, No. 554,734, banded by Frank L. Farley, at Bittern Lake, twelve miles west of Camrose, Alberta, during the month of June, 1927, was found dead on the shore of Wilson Lake, by a resident of Hazleton, Idaho—reported on July 19, 1928.

CALIFORNIA GULL, No. 554,736, banded by Frank L. Farley, at Bittern Lake, Alberta, during the month of June, 1927, was found dead at Lac Pelletier, Saskatchewan, on the main line of the C.P.R., 27 miles south of Swift Current, on September 15, 1928. The bird was probably shot, and apparently was dead from eight to ten hours before it was found.

CALIFORNIA GULL, No. 554,782, yg., was killed by a severe cyclonic hail storm, and was found dead on the shore of "Gull Lake", Alberta, near Bentley, about July 7, 1927. This band was issued to Mr. Frank L. Farley, who cannot account for its use. The bird was probably banded by Mr. Farley on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, during the month of June, 1927.

RING-BILLED GULL, No. 544,527, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was shot on the shore at Comox, British Columbia, on August 6, 1927.

RING-BILLED GULL, No. 544,584, yg., banded by Frank L. Farley, on Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 22, 1927, was found dead on Bear River, near Cornish, Utah, on October 1, 1927. It had apparently been killed the same day.

RING-BILLED GULL, No. 566,061, banded by William I. Lyon, at St. Martin's Island Shoal, Michigan, on July 12, 1927, was found dead, on the north shore of the St. Lawrence River, approximately six miles above Quebec City, Quebec, on September 4, 1928. The bird had apparently been struck with a stone or similar object and one of its legs was broken.

RING-BILLED GULL, No. 497,012, juv., banded by Harrison F. Lewis, on Kégashka River, Saguenay County, Quebec, on August 3, 1927, was found on the island at Kégashka River, on which a colony of Ring-billed Gulls nests annually, in the spring of 1928. The band was found attached to the remains of the gull, which had evidently died some time in the previous year.

RING-BILLED GULL, No. 497,022, juv., banded by Harrison F. Lewis, at Kégashka River, Saguenay County, Quebec, on August 3, 1927, was found, in the spring of 1928, on the island at Kégashka River, on which a colony of Ring-billed Gulls nests annually. The bird had evidently died some time in the previous year.

MALLARD, No. 300,872, banded by T. E. Musselman, at Lima Lake, near Meyer, Illinois, on March 17, 1927, was killed at Prud'homme, Saskatchewan, on September 16, 1928.

MALLARD, No. 540,701, yg., banded by R. H. Bruce, at East St. John, New Brunswick, during the month of June, 1927, was shot at Hampton Marshes, New Brunswick, about October 1, 1928.

MALLARD, No. 540,707, yg., banded by R. H. Bruce, at East Saint John, New Brunswick, during the month of June, 1927, was shot at Hampton Marshes, New Brunswick, about October 1, 1928.

MALLARD, No. 602,245, banded by F. H. Rose, at Moiese, Montana, on September 25, 1927, was shot at Alix, Alberta, on October 3, 1928.

MALLARD, No. 602,875, ad., banded by F. H. Rose, at Moiese, Montana, on October 4, 1927, was shot at a place ten miles south of Red Deer, Alberta, on September 29, 1928.

MALLARD, No. 420,548, juv. m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 8, 1927, was found during the month of May, 1928,—reported by a resident of Doland, South Dakota.

MALLARD, No. 594,225, banded by F. H. Rose, at Moiese, Montana, on November 1, 1927, was shot at King's Lake, 70 miles southeast of Lethbridge, Alberta, on October 6, 1928.

MALLARD, No. 594,428, banded by F. H. Rose, at Moiese, Montana, on November 4, 1927, was shot at Colonsay, Saskatchewan, on September 19, 1928. The bird had only one foot.

MALLARD, No. 594,564, banded by F. H. Rose, at Moiese, Montana, on November 5, 1927, was shot at Priddis, Alberta, on October 5, 1928.

MALLARD, No. 594,570, banded by F. H. Rose, at Moiese, Montana, on November 5, 1927, was shot at a place six miles from Grande Prairie, Alberta,—reported on October 3, 1928.

MALLARD, No. 595,293, banded by F. H. Rose, at Moiese, Montana, on November 8, 1927, was shot at Fishburn, Alberta, on October 11, 1928.

MALLARD, No. 595,338, banded by F. H. Rose, at Moiese, Montana, on November 9, 1927, was killed at Ashmont, Alberta, on September 15, 1928.

MALLARD, No. 595,810, banded by F. H. Rose, at Moiese, Montana, on November 11, 1927, was killed at Duchess, Alberta, on October 8, 1928.

MALLARD, No. 595,504, banded by F. H. Rose, at Moiese, Montana, on November 12, 1927, was killed on the southeast quarter of Section 29, Township 30, Range 2, west of the 5th meridian, Umbach Lake, Alberta, on September 15, 1928.

MALLARD, No. 595,524, banded by F. H. Rose, at Moiese, Montana, on November 12, 1927, was shot at Stavely, Alberta, on October 3, 1928.

MALLARD, No. 595,603, banded by F. H. Rose, at Moiese, Montana, on November 12, 1927, was shot at Macleod, Alberta, on September 22, 1928.

MALLARD, No. 594,698, banded by F. H. Rose, at Moiese, Montana, on November 13, 1927, was killed by an Indian boy at Beaver Lake Indian Reserve, Lac la Biche, Alberta, on September 17, 1928.

MALLARD, No. 595,684, banded by F. H. Rose, at Moiese, Montana, on November 13,

1927, was shot at Cardston, Alberta, on September 24, 1928.

MALLARD, No. 465,909, m., hatched at Rockwood Park Sanctuary, Saint John, New Brunswick, during the month of May, 1927, banded by R. H. Bruce, on November 26, 1927, and released from Caton's Island, during the month of June, 1928, was shot at Grassy Island, near Oak Point, Saint John River, New Brunswick, on September 15, 1928.

BLACK DUCK, No. 557,525, banded by W. Bruce Large, at Rochester, New York, on November 14, 1927, was killed by an Indian, at James Bay, Ontario, some time before October 5, 1928.

BLACK DUCK, No. 557,538, banded by W. B. Large, at Rochester, New York, on November 15, 1927, was shot at a place six miles from Lindsay, Ontario, on September 21, 1928.

BLACK DUCK, No. 596,538, banded by W. Bruce Large, at Rochester, New York, on November 19, 1927, was shot on the Rideau Lakes, Ontario, on October 1, 1928.

BLACK DUCK, No. 557,622, banded by W. B. Large, at Rochester, New York, on December 4, 1927, was shot at Cape Henrietta Maria, Ontario, on September 20, 1928.

BLACK DUCK, No. 596,718, banded by W. B. Large, at Rochester, New York, on December 9, 1927, was shot on Weibikwei Lake, headwaters of the Winisk River, Ontario, on September 2, 1928.

BALDPATE, No. 601,053, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on December 15, 1927, was shot at Barnwell, Alberta, on September 17, 1928.

PINTAIL, No. 602,335, banded by F. H. Rose, at Moiese, Montana, on September 26, 1927, was shot at a place five miles northwest of Kamloops, British Columbia, on October 4, 1928.

RETURNS UPON BIRDS BANDED IN 1928.

CALIFORNIA GULL, No. 555,221, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was shot at Lac la Biche, Alberta, on August 13, 1928.

CALIFORNIA GULL, No. 555,275, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was shot by mistake, at a place two miles east of Castor, Alberta, on August 25, 1928.

CALIFORNIA GULL, No. 555,343, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was found at a place two and one-half miles south of Waskatenaw, Alberta, on September 16, 1928.

CALIFORNIA GULL, No. 555,348, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was "taken" on Lake St. Anne, forty-five miles northwest of Edmonton, Alberta, on August 8, 1928. The bird was found wounded on the beach, and was placed on an island, where gulls breed, in the hope that it would recover.

CALIFORNIA GULL, No. 699,101, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was found on Lesser Slave Lake, Alberta,—reported on August 3, 1928. The band was removed from the bird.

CALIFORNIA GULL, No. 699,140, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was killed by a dog, on the North Saskatchewan River,—reported by a resident of Edmonton, Alberta, on September 2, 1928. The bird had a broken wing.

CALIFORNIA GULL, No. 699,184, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was shot on Lake Wabamun, forty-five miles west of Edmonton, Alberta, on September 15, 1928.

CALIFORNIA GULL, No. 699,211, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was shot by a resident of Big Valley, Alberta, on August 21, 1928, while it was trying to catch young pigeons.

CALIFORNIA GULL, No. 699,272, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was found at the south end of South Cooking Lake, twenty-four miles southeast of Edmonton, Alberta, on July 31, 1928. The band was removed.

CALIFORNIA GULL, No. 699,348, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 26, 1928, was found at a place twenty miles north of Hayter, Alberta,—reported on September 22, 1928.

CALIFORNIA GULL, No. 699,423, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 26, 1928, was shot at Lake Ste. Anne, Alberta, on September 15, 1928.

CALIFORNIA GULL, No. 699,525, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 26, 1928, was caught in a gopher trap and severely injured, on the property of Irvin Iverson, Route 4, Tofield, Alberta,—reported on August 20, 1928.

CALIFORNIA GULL, No. 699,528, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 26, 1928, was "picked up" on the shore of Slave Lake, Alberta,—reported on August 8, 1928.

CALIFORNIA GULL, No. 699,531, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 26, 1928, was found injured on the shore of Gooseberry Lake, Alberta, on September 12, 1928.

CALIFORNIA GULL, No. 699,604, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was found dead on the shore of the North Saskatchewan River, Edmonton, Alberta,—reported on August 31, 1928.

CALIFORNIA GULL, No. 699,610, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was found wounded, on the Fraser Flats, near the Saskatchewan River, Edmonton, Alberta, on August 7, 1928. The bird had probably been shot and it died later.

CALIFORNIA GULL, No. 699,616, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Cam-

rose, Alberta, on June 28, 1928, was killed on the Municipal Golf Course, Edmonton, Alberta, on September 2, 1928. The bird was struck by a golf ball.

CALIFORNIA GULL, No. 699,699, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot in mistake for a hawk, at a reservoir in antelope valley, a desert in the northeastern part of Los Angeles County, California, on September 1, 1928.

CALIFORNIA GULL, No. 699,750, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot accidentally on Lesser Slave Lake, Township 74, Range 14, west of the 5th meridian, Alberta, on August 19, 1928.

CALIFORNIA GULL, No. 699,795, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was caught at 10,020 Bridge Road, Edmonton, Alberta, on July 30, 1928. The bird was sick when caught. It died three days later.

CALIFORNIA GULL, No. 699,805, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was recovered by a resident of 10922 129th Street, Edmonton, Alberta, on August 6 ,1928.

MALLARD, No. 423,128, banded by F. W. Robl, at Ellinwood, Kansas, on March 6, 1928, was shot at a place forty miles north of Medicine Hat, Alberta, on September 17, 1928.

PINTAIL, No. 540,241, banded by L. Arnold, at Buena Vista Lake, California, on February 18, 1928, was shot at Castor, Alberta, on October 1, 1928.

PINTAIL, No. 557,021, banded by Bert Lloyd, at Davidson, Saskatchewan, on June 22, 1928, was shot at Sabetha, Kansas, on October 2, 1928.

PRAIRIE FALCON, No. 226,109, yg., banded by Carl Richardson, at a place near Merril, Oregon, on May 2, 1928, was killed while preying on chickens, at a place approximately thirty miles east of Medicine Hat, Alberta, shortly before August 8, 1928.

GREAT HORNED OWL, No. 201,584, ad., banded by E. Beaupre, at Kingston, Ontario, on March 8, 1928, was shot at a place about one mile from where it was banded, on March 31, 1928.

FLICKER, No. 287,800, im., banded by George Lang, at Indian Head, Saskatchewan, on June 23, 1928, was "picked up" dead one mile west of the place where it was banded, on August 20, 1928.

STELLER'S JAY, No. 286,779, ad., banded by P. S. Walker, at the University of British Columbia, Point Grey, British Columbia, on February 19, 1928, was caught in a poultry house in the same locality and destroyed, on March 30, 1928.

STELLER'S JAY, No. 286,780, ad., banded by P. S. Walker, at the University of British Columbia, Point Grey, British Columbia, on March 4, 1928, was killed at a place fifteen miles east of Vancouver, British Columbia, on September 9, 1928.

STELLER'S JAY, No. 360,121, ad., banded by P. S. Walker, at the University of British Columbia, Point Grey, British Columbia, on March 4, 1928, was caught in a poultry house in the same locality and destroyed, on March 30, 1928.

GOLDEN-CROWNED SPARROW, No. 569,-454, ad., banded by P. S. Walker, at University Hill, Point Grey, British Columbia, on March 4, 1928, was found dead in the locality in which it was banded, on May 6, 1928.

OREGON TOWHEE, No. 485,130, ad. f., banded by P. S. Walker, at Point Grey, British Columbia, on April 30, 1928, was re-captured several times at the same station until June 12, 1928, and was found dead at the same station, on June 18, 1928.

YELLOW WARBLER, No. B7903, ad. f., banded by R. W. Tufts, at Wolfville, Nova Scotia, on June 27, 1928, was found dead near its second nest, at a place fifty yards from the place where it was banded, on July 2, 1928.

ROBIN, No. 437,931, yg., banded by E. A. Mitchell, at Britannia-on-the-Bay, Ontario, on May 26, 1928, had its band returned by a resident of Hyman, South Carolina,—reported on August 31, 1928.

ROBIN, No. 669,121, nestling, banded by R. Owen Merriman, in a garden at 101 Clergy Street West, Kingston, Ontario, on June 9, 1928, was killed by a cat at the same station, on June 11, 1928.

ROBIN, No. 623,642, imm., banded by Fred. W. Fenety, at Fredericton, New Brunswick, on June 16, 1928, was found dead in the same locality, on June 23, 1928. It had evidently been killed by a cat.

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CONTENTS

	PAGE
An "Ozarkian" Fauna from Jasper Park, Alberta. By C. H. Kindle	145
Summer Birds of Miners Bay and Vicinity, Haliburton County, Ontario. By Margaret K. H. Mitchell	147
Glimpses of Little-Known Western Lakes and their Bird Life. By J. A. Munro (*Continued*)	152
An Annotated List of the Mammals of Aweme, Manitoba. By Stuart Criddle	155
Marine Molluscs Collected by Frits Johansen in the Maritime Provinces of Canada in the Autumn of 1926. By W. H. Dall	159
Pellets of Hawks and Owls are Misleading. By Allan Brooks	160
An Early List of Ontario Birds. By James L. Baillie, Jr	161
Random Notes on the Fluctuation in Numbers of Rodents and Grouse in Canada. By P. A. Taverner	162
Notes and Observations:	
First Record of the Prothonotary Warbler in the Toronto Region. By Robt. W. Lindsay	164
Three of Jack Miner's Tagged Geese Killed by One Man. By Manly F. Miner	164
A Flicker Murderer. By J. Roland Brown	165
Substantiation of the Winter Record of the Florida Gallinule, Toronto. By L. L. Snyder	165
The Soaring Flight of Birds	165
Holboell's Grebe near Kingston, Ontario, in Midwinter. By L. L. Snyder	166
Deaths Among Coots at Summerland, B.C. By Herbert M. Simpson	166
The Grasshopper Sparrow at Toronto, Ontario. By R. J. Rutter	166
Early Northern Migration of Robins. By L. S. Dear	166
Starlings at a Feeding Station. By R. Owen Merriman	167
Towhee at Toronto in February. By Ida Merriman	167
Status of Sea Birds on Bare Island, British Columbia, 1927. By J. A. Munro	167
What Surgeon to the Birds Treated This Pine Grosbeak? By Hoyes Lloyd	167
Swallows' Nests. By John W. Piggott	168
Microsorex hoyi, A New Mammal for the Toronto Region. By C. E. Hope	168
Jack Miner's New Book	168

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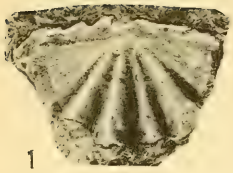
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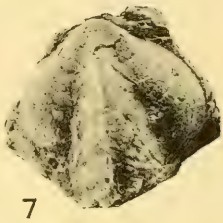
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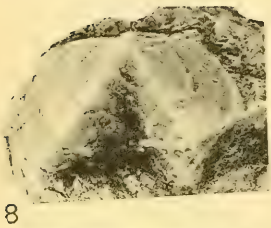
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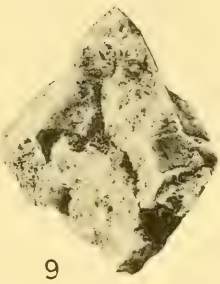
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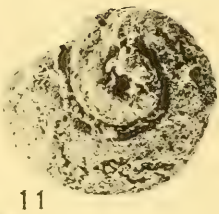
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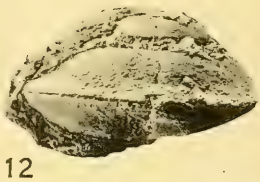
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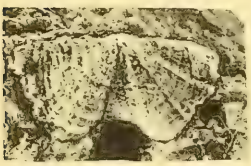
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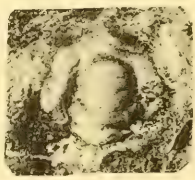
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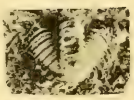
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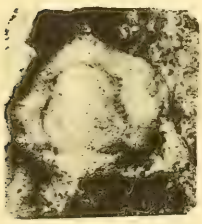
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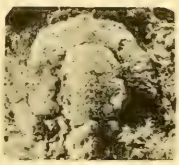
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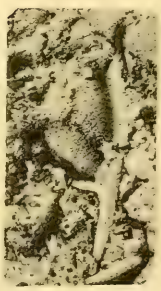
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AN "OZARKIAN" FAUNA FROM JASPER PARK, ALBERTA[1]

By C. H. KINDLE

A SMALL collection of fossils from Jasper Park was turned over to the writer by Dr. E. M. Kindle of the Geological Survey of Canada in 1927 with the suggestion that they were probably of Ozarkian age. Later in the year the writer visited the United States National Museum and compared this fauna with the somewhat similar one which Dr. Walcott had collected in the Rocky Mountains about 150 miles to the south-east of Jasper Park.

The locality at which this fauna was found is seven miles north of Jasper at Swift's ranch. The fossils came from a ten foot layer of thin-bedded subcrystalline limestone at the head of an irrigation ditch. The bed is No. 4 of the Palisade section. Dr. Kindle describes this as follows: (written communication)

1. Grey shale and limestone (Carboniferous) ..... 500′
2. Grey to blue limestone Lower half magnesian (Devonian) ..... 2500′
3. Olive grey shale and covered (without fossils) ..... 340′
4. Thin bedded subcrystalline limestone ..... 10′
5. Hard laminated limestone interbedded with shaly bands and beds of magnesian limestone ..... 250′+
6. Hard semilithographic limestone in bands a few feet thick separated by bands of dark shaly limestone weathering into thin sheets ⅛″ thick. Beautifully laminated limestone with layers 1/16″ or less thick show the lamination in weathered surfaces. There are also bands of limestone with either tiny limestone pebbles or a variety of brecciation ..... 200′

The fauna in the writer's hands is composed of five species of trilobites, four species of brachiopods, and one gasteropod. Five of these appear to be new. The specimens will be deposited in the National Museum of Canada. Since they appear to belong to the first fauna referable to Dr. E. O. Ulrich's proposed Ozarkian system that has been discovered in Alberta north of the Banff district, it seems desirable that an account of them should be published at this time.

The writer is indebted to Dr. Resser of the U.S. National Museum for the opportunity to study comparable material in that institution. Professor B. F. Howell has kindly enabled the writer to utilize the laboratory facilities of Princeton University in the present study.

BRACHIOPODA

Eoorthis ochus Walcott
Figs. 1 and 2

Eoorthis ochus Walcott 1924, Smithsonian Misc. Coll. Vol. 67, No. 9, p. 509, pl. 117, figs. 10-13. This is one of the most common fossils in the collection. It has well developed radiating ribs, usually six in the brachial and five in the pedicle valve. In many specimens the surface is covered with fine radiating striæ, six in the space of one mm., though in some these are not preserved.

Eoorthis ochus var. *concentrica* n. var.
Fig. 3

One of the figures accompanying Walcott's original description of *Eoorthis ochus* shows concentric striæ about one mm. apart. The best preserved specimens in our collection have well developed concentric striæ but they are much closer together than shown by Walcott. This difference seems to have variety rank. The concentric striæ on it are fully as prominent as the radiating ones and are spaced from one-half to one-third of a mm. apart.

A single specimen resembles *E. ochus* var. *concentrica* in its concentric and radiating striæ, but the radiating ribs are not simple as in the above species. There are two crests in each rib, the outer more prominent than the inner.

Eoorthis cf. *ochus* Walcott
Figs. 4 and 5

Some fragmentary specimens in the collection are smaller than the specimens referred to *E. ochus* and the ribs are not elevated to the same extent.

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Huenella jasperensis n. sp.
Fig. 6

This species has strong concentric markings and elevated radiating plications, and a deep broad sinus on the pedicle valve. The radiating plications are stronger and less numerous than in *H. icetas* Walcott, there being 14 on each side of the sinus in Walcott's species, but in ours only 6 or 7. The brachial valve is not present in the collection.

Syntrophia convexa n. sp.
Figs. 7, 8 and 9

This species differs from *S. isis* Walcott in having a much deeper and greatly prolonged median sinus in the pedicle valve . The sinus is curved so convexly that one end of it is nearly at right angles to the other (see Fig. 5f.) The brachial valve has a correspondingly elevated median fold to fit this convex sinus. The median length of the valve shown in Fig. 5c is 8 mm. and its width is 8.5 mm.

GASTROPODA

Raphistoma sp. undet.
Figs. 11 and 12

This little trochoid shell, which is one of the commonest fossils in the collection, is provisionally referred to this genus. Exfoliation of the shell renders the systematic placing of this shell difficult at present. Some of our specimens show a narrow depression on the periphery of the whorl but this cannot be seen on others.

TRILOBITA

Tostonia cf. *iole* Walcott?
Figs. 13, 14, 15

Tostonia iole Walcott, 1925, Smithsonian Misc. Coll., Vol. 75, No. 3, p. 117, pl. 18, figs. 10-14. This species was described by Walcott from the Upper Cambrian of the Eureka District, Nevada. His figures of the pygidium show the pleural lobes terminating in points as is indicated Fig. 17. This seems to show faintly in several of the other pygidia illustrated, but not in all. The heads thought by Walcott to belong with this type of pygidium are very similar to those of our Figs. 9 and 12, though his appear to have a more quadrate outline.

Hardyia metion Walcott ?
Figs. 16 and 17

Hardyia metion Walcott, 1925, Smithsonian Misc. Coll., Vol.75, No. 3, p. 91, pl. 18, fig. 9

In size and general shape these specimens resemble Walcott's species. The one illustrated in Fig. 8 is more like the type in having the two glabellar furrows, but differs in not having a straight and narrow rim in front of the glabella, but rather a convex and slightly wider one.

Symphysurina walcotti n. sp.
Fig. 18

There is one pygidium in the collection which seems referable to *Symphysurina* Ulrich (Walcott 1925, p. 108). It is 10 mm. wide and 4.8 mm. long. It has two ribs at the anterior end, the second of which is very faint. Two more slight depressions indicate a total of four segments on the axis. A specimen of the same species collected by Walcott from his locality 16 u, in Sinclair Canyon, measures 8 mm. in width and 4 mm. in length.

Trilobita, gen. and sp. undet.
Figs. 19, 20, 21 and 22

A single free cheek, with parts missing, seems not to belong to any of the trilobites described above and, so far as the writer has been able to determine, can not at present be referred to any described species.

Correlation

A fauna resembling the one here described in that it contains *Eoorthis ochus*, *Syntrophia* and *Symphysurina walcotti*, was collected by Walcott, from his locality 16u, in Sinclair Canyon, near Radium Hot Springs, British Columbia. This comes from the Mons formation, which he refers to the Ozarkian system. *Hardyia metion* was described from the Mons formation also and *Huenella* is known from the Mons formation and the Upper Cambrian. A fauna apparently of the same age has been reported from the Rocky Mountain section 6 miles North West of Banff by E. M. Kindle[2] where it occurs near the top of the Sawback formation. The fauna belongs in the series to which Walcott[3] gave the name Sarceen. The Ozarkian system has been proposed by Ulrich to include those faunas often referred to as Cambro-Ordovician which are neither typical Cambrian nor typical Ordovician. This new system is not universally recognized, and many geologists refer the Mons to the Lower Ordovician. Whether the Ozarkian will be a permanent addition to the palæozoic systems or not it seems clear that this fauna falls within the group of faunas called Ozarkian by Dr. Ulrich. This Jasper Park fauna is evidently closely related to that of the Mons formation which is widely distributed in the Canadian Rockies and is probably of the same age.

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[2] See (4) page 509.
[3] See (1) page 116.
[4] See (4) page 471.

LITERATURE CITED

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EXPLANATION OF PLATE

All figures x 3 except 4 and 5.

Eoorthis ochus Walcott

Figs. 1 and 2. Brachial valves.
Fig. 1 shows surface covered with fine radiating striæ.
Fig. 2 is an exfoliated shell.

Eoorthis ochus var. *concentrica* n. var.

Fig. 3. Brachial valve.

Eoorthis cf. *ochus* Walcott

Fig. 4. Brachial valve. x 3½.
Fig. 5. Pedicle valve. x 3½.

Eoorthis sp. undet.

Fig. 6. Pedicle valve.

Syntrophia convexa n. sp.

Fig. 7. Brachial valve of type.
Fig. 8. Pedicle valve of another specimen showing the deep sinus.
Fig. 9. Brachial valve, front view of type.

Huenella jasperensis n. sp.

Fig. 10. Pedicle valve of type.

Raphistoma ? sp. undet.

Fig. 11. Spire view of incomplete specimen.
Fig. 12. Side view of incomplete specimen. A narrow depression may be seen on the periphery of the lower whorl.

Tostonia cf. *iole* Walcott

Figs. 13 & 14. Incomplete cranidia.
Fig. 15. Pygidium.
Fig. 15a. An interpretation of poorly preserved margin of number 15.

Hardyia metion Walcott

Figs. 16 & 17. Cranidia.

Symphysurina walcotti n. sp.

Fig. 18. Pygidium of type.

Trilobita, gen. and sp. undet.

Figs. 19 and 21. Cranidia.
Fig. 20. Pygidium.
Fig. 22. Free cheek.

SUMMER BIRDS OF MINERS BAY AND VICINITY, HALIBURTON COUNTY, ONTARIO

By MARGARET K. H. MITCHELL

THE accompanying list of birds does not claim to be in any way comprehensive for the region covered. It is compiled from notes made in a somewhat haphazard manner during twelve years spring and summer residence at Miners Bay; these notes being made each season more for personal satisfaction than "in the interests of science". Also, the author finding it difficult to obtain a companion who was enthusiastic about birds and energetic enough to carry a canoe, observations have been confined to lakes, streams, roads and woods of easy access.

The region covered consists of Miners Bay, Gull Lake, Moore's Lake, the Gull river as far as the county line toward Norland, Sheldon's Lake, Black Lake, Black Creek, the Bob Lakes and Racketty timber slide—these with their surrounding shores and woods.

The immediate vicinity of Miners Bay has been well covered, as well as the road as far east as Kinmount.

The lakes of the district are small (Gull Lake, the largest, being about five miles long by one mile wide) having for the most part rocky shores, only a few stretches of sandy beach being found. The streams are shallow, in some cases forming narrow stretches of marsh. The timber is second growth, largely poplar and birch, with some areas of pine and several groves of very fine maples. Some elms grow about Miners Bay.

As no specimens have been taken subspecific names have been omitted where there is reasonable doubt as to the form occurring in the region.

Evidences of breeding have been given whenever positive; many other species than those recorded as doing so most probably breed owing to their continued presence during the spring and summer, but comment has been omitted where actual proof is lacking. A few nesting records made by Mr. Stuart Thompson in 1925 while on a canoe trip from Coboconk to Minden are, by his permission, included.

James H. Fleming's "Birds of the Muskoka District and Parry Sound" (*The Auk*, Vol. XVIII, No. 1, 1901) forms an interesting companion; also L. L. Snyder's and J. L. Baillie's "Notes on Birds and Mammals of Brent and Vicinity, Algonquin Park, Ontario, July and August, 1922" (*The Canadian Field-Naturalist*, Vol. XXXVII, No. 5), and A. H. Wright's and S. E. R. Simpson's "The Vertebrates of the Otter Lake Region, Dorset, Ontario" (*The Canadian Field-Naturalist*, Vol. XXXIV, No. 9, December, 1920).

1. *Gavia immer* (Brünn)—LOON.—Common. Their abundance seems to vary considerably. Four or five years ago they were plentiful, then for two years only a few were seen, while this last summer (1927) they were again very common. As Messrs. Snyder and Baillie suggest in their above mentioned article they may change their feeding grounds frequently, as individuals are continually flying over during the summer.

2. *Larus argentatus* Pont.—HERRING GULL.—A small colony breeds each year on Gull Rock toward the north end of Gull Lake. Three or four nests seem to be the extent of the colony. The young in the downy stage when pursued wedge themselves headfirst into crevices of the rocks or take to the water.

3. *Mergus serrator* Linn.—RED-BREASTED MERGANSER (?).—Several females with broods of young were seen in 1926 and 1927, and young have been recorded prior to these dates. Last year (1927) a family made their headquarters in a cove near our cottage on Miners Bay spending many hours sleeping and preening themselves on a low point of rock. These females have been observed closely, the indistinctly white throats, colour of the heads, and size of the birds being the basis for presuming the species to be *serrator*. No adult males have ever been seen.

4. *Anas rubripes* Brewst.—BLACK DUCK.—Three or four individuals seen each summer.

5. *Branta canadensis canadensis* (Linn.).—CANADA GOOSE—This bird has not been seen by the author, but is included here on the authority of the following quotation from a letter from Mr. Mark Robinson, Superintendent of Algonquin Park, to Mr. J. L. Baillie of the Royal Ontario Museum, dated December 29, 1925. "Major Steele and wife found a pair of wild Canada Geese with a flock of young in August, 1921, in a large marsh that lies south of Porcupine Lake . . . which lies in the township of Lawrence in Haliburton county. These geese were seen by a number of persons and I think the entire flock were shot by some of the resident hunters early in September of same year . . . [it seems that] the wild geese had been injured birds that failed to reach their far north destination."

6. *Botaurus lentiginosus* (Montag.).—BITTERN.—Common. Almost every favourably marshy site seems to have its resident bittern.

7. *Ardea herodias herodias* Linn.—GREAT BLUE HERON.—One of these splendid and dignified birds is always about Miners Bay in July and August, and one or more specimens are looked for each year in Black Creek. Other individuals are frequently seen or heard flying over in the dusk or early morning.

8. *Gallinago delicata* (Ord.).—WILSON'S SNIPE.—A single record of this bird was made on May 21, 1923, when it was seen in a swampy meadow on Miners Bay.

9. *Tringa solitaria solitaria* Wilson.—SOLITARY SANDPIPER.—Recorded only once in late August of 1925, on the west shore of Gull Lake.

10. *Actitis macularia* (Linn.).—SPOTTED SANDPIPER.—Common resident. Either nests with eggs, or young, are seen each summer.

11. *Oxyechus vociferus* (Linn.).—KILLDEER.—Frequently observed in fields along the Miners Bay-Kinmount road.

12. *Bonasa umbellus togata* (Linn.).—CANADA RUFFED GROUSE.—Four or five years ago this bird was very common in the district, it being customary to flush several, either singly or in coveys, during any walk through the woods; now a single individual is quite an event in a day's trip. Whether this is due to shooting or the natural fluctuation which is said to occur with this species is not known.

A nest was built in the spring of 1923 about fifteen feet from the back door of one of the cottages on Miners Bay, the house, of course, being vacant at the time. It contained fourteen eggs.

13. *Circus hudsonius* (Linn.).—MARSH HAWK.—Seen frequently. Quite common in the spring beating over a swampy field behind the author's cottage at Miners Bay.

14. *Buteo lineatus lineatus* (Gmel.).—RED-SHOULDERED HAWK.—One seen in July of 1927.

15. *Buteo platypterus* (Vieill.).—BROAD-WINGED HAWK.—A pair of these birds has been recorded for several years from a maple wood running back from Miners Bay. In 1920 a nest containing two young was found in one of these large maples.

16. *Haliæetus leucocephalus alascanus* C. H. Townsend.—NORTHERN BALD EAGLE.—Recorded only once, July 23, 1920.

17. *Cerchneis sparveria sparveria* (Linn.).—SPARROW HAWK.—Seen commonly every summer.

18. *Pandion haliaetus carolinensis* (Gmel.).—OSPREY.—Seen almost every summer about Gull Lake.

19. *Cryptoglaux acadica acadica* (Gmel.).—SAW-WHET OWL.—Breeds. Young specimen caught by children at Miners Bay P.O. Died in captivity.

20. *Otus asio asio* (Linn.).—SCREECH OWL.—Heard only once, in 1925.

21. *Bubo virginianus virginianus* (Gmel.).—GREAT HORNED OWL.—Heard practically every summer during July and August. Has never been seen.

22. *Coccyzus erythrophthalmus* (Wils.).—BLACK-BILLED CUCKOO.—Two records only of this bird have been made, one in August, 1924, and one in August, 1927, It is probably commoner than this would indicate.

23. *Ceryle alcyon* (Linn.).—BELTED KINGFISHER.—One of the commonest birds in the region. It is found everywhere. Nests recorded from two places along the Minden road at Miners Bay.

24. *Dryobates villosus* (Linn.).—HAIRY WOODPECKER.—Not very common. A female with young was recorded on July 11, 1927.

25. *Dryobates pubescens medianus* (Swains.).—DOWNY WOODPECKER.—Quite a common resident. Mr. Thompson found two nests in June, 1925, and the author young birds in early July, 1927.

26. *Picoides arcticus* (Swains.).—ARCTIC THREE-TOED WOODPECKER.—This bird has been recorded only once, in early May of 1919.

27. *Sphyrapicus varius varius* (Linn.).—YELLOW BELLIED SAPSUCKER.—A common bird in the region. Young birds are recorded for the first week in August, 1926.

28. *Phlœotomus pileatus abieticola* (Bangs).—NORTHERN PILEATED WOODPECKER.—The sight of this bird is always considered an event of the summer. It has been seen four times in the last eight years and each time stands out quite clearly in the author's memory. Once it was found in deep maple woods where it flew like some black and evil spirit from tree to tree. The other three times it has been seen flying over head from one part of the woods to another, seeming somehow out of its element when in the open sunlight.

29. *Melanerpes erythrocephalus* (Linn.).—RED-HEADED WOODPECKER.—An uncommon bird seen very occasionally along open roads.

30. *Colaptes auratus* (Linn.).—FLICKER.—Not very common. One or two are usually seen about some drowned trees in Black Creek. A nest found with young at Miners Bay in 1920.

31. *Antrostomus vociferus vociferus* (Wils.).—WHIP-POOR-WILL.—A common bird in the district. In the spring its incessant "whipping" at night is positively annoying. One individual was counted giving four hundred-odd whip-poor-wills without stopping. In July and August they confine their calling to the evening, usually being very punctual and beginning about a quarter to eight.

32. *Chordeiles virginianus virginianus* (Gmel.).—NIGHT-HAWK.—Common. Their notes are one of the commonest evening sounds. They have been observed once or twice during the day catching grasshoppers, darting after them in short flopping rushes from a flat expanse of rock used as a base.

33. *Chætura pelagica* (Linn.).—CHIMNEY SWIFT.—Common about Miners Bay, where they make their headquarters in the chimney of the little church. During the last four years four nests have been found in ice-houses. The young when partly grown cling to the nest, tails over the edge, beaks pointing up the wall. Several pieces of twig were stuck here and there on the wall about the nests, perhaps try-outs or false starts.

34. *Archilochus colubris* (Linn.)—RUBY-THROATED HUMMINGBIRD.—Seen only occasionally during the summer.

35. *Tyrannus tyrannus* (Linn.).—KINGBIRD.—Common. Breeds. A pair nested for two summers in an elm above a dense thicket behind the author's cottage at Miners Bay. Mr. Thompson reports three nests from Haliburton county in June, 1925.

36. *Myiarchus crinitus* (Linn.).—CRESTED FLYCATCHER.—Seen or heard each summer. Not very common.

37. *Sayornis phœbe* (Lath.).—PHOEBE.—One of the commonest birds of the region. Nests about cottages, under bridges and on rocky ledges. Mr. Thompson reports five nests in June, 1925, and the author would have no difficulty in finding a like number.

38. *Nuttallornis borealis* (Swains.).—OLIVE-SIDED FLYCATCHER.—Heard in this district only once, in the summer of 1925.

39. *Myiochanes virens* (Linn.).—WOOD PEEWEE.—Fairly common in the deeper woods. An occupied nest was found in the spring of 1920 near Miners Bay.

40. *Empidonax minimus* (W. M. & S. F. Baird).—LEAST FLYCATCHER.—Common. Breeds. Young birds are reported for July 8, 1927.

41. *Cyanocitta cristata cristata* (Linn.).—BLUE JAY.—Seen in small flocks in late August.

42. *Corvus brachyrhynchos brachyrhynchos* Brehm.—CROW.—This bird seems to vary in numbers from year to year. Some seasons hardly any are seen and at other times they are quite common, as

was the case in 1927, when many small flocks were seen during July and August.

43. *Molothrus ater ater* (Bodd.).—COWBIRD.—Common. Its eggs have been found in the nests of Song Sparrows (frequently), Red-eyed Vireo (once), and Hermit Thrush (once). A young bird was seen in 1927 being fed by a Yellow Warbler, and in the same year a fledgling was removed from a nest of the same species.

44. *Agelaius phœniceus phœniceus* (Linn.).—RED-WINGED BLACKBIRD.—A few usually seen in August along Black Creek.

45. *Sturnella magna magna* (Linn.).—MEADOWLARK.—Seen occasionally along open roads.

46. *Icterus galbula* (Linn.).—BALTIMORE ORIOLE—Quite common about Miners Bay. Breeds; some fine elms in the vicinity forming excellent nesting sites.

47. *Quiscalus quiscula æneus* Ridgw.—BRONZED GRACKLE.—Mr. Thompson reports one nest of this species in Haliburton county in June, 1925.

48. *Carpodacus purpureus purpureus* (Gmel.).—PURPLE FINCH.—A common bird in the region. Flocks are seen in the spring and odd pairs throughout the summer. A shad bush which touches the verandah of the author's cottage is visited all summer for its berries.

49. *Passer domesticus domesticus* (Linn.).—HOUSE SPARROW.—Seen in Kinmount.

50. *Acanthis linaria* (Linn.).—REDPOLL.—A small flock seen in the spring of 1920 (May).

51. *Astragalinus tristis tristis* (Linn.).—GOLDFINCH.—A common resident.

52. *Spinus pinus* (Wils.).—PINE SISKIN.—Fairly common in flocks in May. Also recorded for the first week in July, 1927.

53. *Poœcetes gramineus gramineus* (Gmel.).—VESPER SPARROW.—A common species along open roads.

54. *Zonotrichia albicollis* (Gmel.).—WHITE-THROATED SPARROW.—Heard in the spring and seen occasionally during the summer.

55. *Spizella passerina passerina* (Bech.).—CHIPPING SPARROW.—A common resident. Breeds. In the spring this bird is frequently heard singing at night. Mr. Thompson reports three nests found in June, 1925.

56. *Junco hyemalis hyemalis* (Linn.).—SLATE-COLOURED JUNCO.—Fairly common. Breeds. A nest was found most pleasantly situated under a low bank on an old wood road in July of 1920. Young birds have been observed at other times.

57. *Melospiza melodia melodia* (Wils.).—SONG SPARROW.—Probably the commonest bird in the region. Nests are found each year. Its song is a never-failing source of pleasure, and we listen from year to year for old friends who have some little recognizable individuality in their performance.

58. *Pipilo erythrophthalmus erythrophthalmus* (Linn.).—TOWHEE.—This bird is heard each year in only one locality—at the north end of Black Lake.

59. *Hedymeles ludovicianus* (Linn.).—ROSE-BREASTED GROSBEAK.—Quite common throughout the district. A flock of about fifteen was observed in May of 1920.

60. *Passerina cyanea* (Linn.).—INDIGO BUNTING.—Seen only occasionally along open road sides. Its song was first heard in early August, 1926.

61. *Piranga erythromelas* Vieill.—SCARLET TANAGER.—A quite common resident. Heard nearly every summer on a thickly wooded hill at Miners Bay. Also frequently seen in the woods along the Sheldons Lake trail. The sight of this bird never fails to cause excitement in our party.

62. *Progne subis subis* (Linn.).—PURPLE MARTIN.—A steadily increasing colony of Martins is to be found in Kinmount. Several small houses placed near the station are fully occupied each summer.

63. *Hirundo erythrogastra* Bodd.—BARN SWALLOW.—Common about farms. Nests every year at the Miners Bay P.O.

64. *Iridoprocne bicolor* (Vieill.).—TREE SWALLOW.—A few seen each year near the mouth of Black Creek.

65. *Riparia riparia* (Linn.).—BANK SWALLOW.—Seen in small numbers in the same locality as the preceding species. Mr. Thompson reports several colonies breeding in Haliburton county in June, 1925.

66. *Bombycilla cedrorum* Vieill.—CEDAR WAXWING.—A very common bird throughout the district. Breeds. A family of four deserted young were found one summer and hand fed for several days, but all eventually died.

They are nearly always to be found in August in a clump of choke cherry trees behind the author's cottage, and are frequent visitors at the shad bush favoured by the purple finches.

67. *Lanius ludovicianus migrans*. Palmer.—MIGRANT SHRIKE.—Seen only once on the Minden road near Miners Bay.

68. *Vireosylva olivacea* (Linn.).—RED-EYED VIREO.—Common, breeds. Young birds are frequently seen. A nest with three young was found quite near the cottage on June 22, 1922. A late frost came on the night of the 25th and on the morning of the 27th the young vireos were dead, apparently killed by it.

69. *Vireosylva gilva gilva* (Vieill.).—WARBLING VIREO.—A nest of this species was found at Miners Bay in 1920 (May 28). The identification of the species was made largely by the song, which was an unbroken warble.

70. *Mniotilta varia* (Linn.).—BLACK AND WHITE WARBLER.—Quite a common species in the region.

71. *Dendroica æstiva æstiva* (Gmel.).—YELLOW WARBLER.—Common in certain localities. Seen all summer about Miners Bay and nests in the vicinity. One nest found last summer (1927) was completely occupied by a cowbird fledgling. This was removed but the warblers did not return to the nest.

One nest of this species was seen in process of construction and appeared to be made completely of some white substance which looked like white cotton string. The nest was in an inaccessible thicket and when looked for later in the season had disappeared.

72. *Dendroica cærulescens cærulescens* (Gmel.).—BLACK-THROATED BLUE WARBLER.—Found in one or two localities.

73. *Dendroica coronata* (Linn.).—MYRTLE WARBLER.—By far the commonest warbler in the region. Adults are seen continually gathering beakfuls of insects in the pines about the author's cottage, and although trailed over rocks and through undergrowth a nest has never been found.

74. *Dendroica magnolia* (Wils.).—MAGNOLIA WARBLER.—Apparently not very common. Seen only occasionally.

75. *Dendroica pensylvanica* (Linn.).—CHESTNUT-SIDED WARBLER.—Next to the Myrtle this is the commonest warbler of the region.

76. *Dendroica castanea* (Wils.).—BAY-BREASTED WARBLER.—Seen occasionally.

77. *Dendroica virens* (Gmel.).—BLACK-THROATED GREEN WARBLER.—A common warbler, particularly about Miners Bay. Its song is one of the most frequently heard.

78. *Seiurus aurocapillus* (Linn.).—OVEN-BIRD.—Common. Breeds. An old nest was found lying on an open hillside near Miners Bay, and Mr. Thompson reports a nest containing five young on the west shore of Gull Lake, June 23, 1925. The extraordinary and beautiful flight song of this species has been heard several times. Last summer (1927) it was recorded three times between July 1st and 10th. Were it not finished off with the usual "Teacher" notes it would be almost impossible to believe that it came from such a mousey little creature as the ovenbird.

79. *Seiurus noveboracensis noveboracensis* (Gmel.).—WATER THRUSH.—Always to be found either about Miners Bay or along a creek entering it. Also seen near Sheldons Lake.

80. *Geothlypis trichas trichas* (Linn.).—MARYLAND YELLOW-THROAT.—Common about Miners Bay.

81. *Wilsonia canadensis.* (Linn.).—CANADA WARBLER.—Fairly common.

82. *Setophaga ruticilla* (Linn.).—REDSTART.—Common. Breeds. Is found everywhere throughout the region. A nest was found at Miners Bay in the spring of 1920, and young birds have been seen several times since.

83. *Dumetella carolinensis* (Linn.).—CATBIRD.—Common, particularly so about Miners Bay where one or more nests are to be found each summer. Its song is a constant entertainment all summer.

84. *Toxostoma rufum* (Linn.).—BROWN THRASHER.—Seen occasionally in various localities. A nest was found some years ago in a thick hawthorn bush. It is heard now and then at Miners Bay singing in the early morning and is always considered a rare treat.

85. *Troglodytes aëdon aëdon* Vieill.—HOUSE WREN.—Common about Miners Bay. Has nested for years in a shed at the P.O., and once at the author's cottage on a shelf placed under the ice-house eaves for the phoebe.

86. *Nannus hiemalis hiemalis* (Vieill.).—WINTER WREN.—Always looked for, and generally found, each year at a certain place along the Minden road where an old wood road branches off to a deserted farm.

87. *Certhia familiaris americana* Bonap.—BROWN CREEPER.—Seen occasionally.

88. *Sitta carolinensis carolinensis* (Lath.)—WHITE-BREASTED NUTHATCH.—Fairly common throughout the district.

89. *Penthestes atricapillus atricapillus* (Linn.)—CHICKADEE.—Common. Breeds. Although a nest of this species has never been found, young birds are observed almost every summer.

90. *Regulus satrapa satrapa* Licht.—GOLDEN-CROWNED KINGLET.—Seen occasionally.

91. *Regulus calendula calendula* (Linn.).—RUBY-CROWNED KINGLET.—Heard in the spring.

92. *Hylocichla mustelina* (Gmel.).—WOOD THRUSH.—Seen rarely, and heard more rarely still. I know of no bird song that is so mysteriously thrilling.

93. *Hylocichla fuscescens fuscescens* (Steph.).—VEERY.—Common. Breeds. In the spring its song is to be heard on every side, and no rainy day during the summer is complete without a Veery singing about the cottage. Young birds are frequently seen, and for two years a nest was built in a clump of juniper about fifteen feet from the house.

94. *Hylocichla ustulata swainsonii* (Tschudi).—OLIVE-BACKED THRUSH (?).—A thrush which is probably the Olive-backed is frequently seen, but as no specimens have been taken nor any song heard, positive identification is impossible.

95. *Hylocichla guttata pallasi* (Cab.).—HERMIT THRUSH.—Common. Breeds. Is to be heard, in spring, all day; in summer, every evening about Miners Bay. Its song, though heard so often, never fails to hold the listener's complete attention. A nest was found by the cottage in May, 1922, containing three thrushes' eggs and one cowbird's; this latter was removed, and in a few days another of the same species was again found and removed from the same nest.

96. *Planesticus migratorius migratorius* (Linn.)—ROBIN.—Common. Breeds, chiefly about buildings, though nests are also frequently found along roads and in open woods.

97. *Sialia sialis sialis* (Linn.).—BLUEBIRD.—Seen occasionally along open roads, chiefly the Kinmount road.

The author's thanks are due to Mr. L. L. Snyder and Mr. J. L. Baillie of the Royal Ontario Museum; to the former for the checking of this list, and to the latter for obtaining references from Mr. Mark Robinson and Mr. Stuart Thompson

GLIMPSES OF LITTLE-KNOWN WESTERN LAKES AND THEIR BIRD LIFE

By J. A. MUNRO

(*Continued from page 132*)

WABUMAN LAKE, ALBERTA

THIS is a deep fresh-water lake approximately fifteen miles long and three miles wide. The surrounding country is broken and hilly and for the most part timbered with poplar, balm-of-gilead and birch with some jack-pine and tamarack, and with spruce in the muskegs. The forest reaches close to the shore in many places and perhaps is more continuous and heavier on the south side. There are also areas of small grassy hills, in some places covered with low shrubs.

The beaches on the east and west sides are sandy and have become popular summer resorts. Seba Beach at the west end of the lake is perhaps the more attractive, the summer cottages being built in a forest of tall, slim, white-barked poplar close to the lake-shore. The lake water is clear and pure. Whitefish are taken in commercial quantities and pike and perch offer sport to the angler. A number of spring creeks and several large streams empty into the lake and it is drained by Wabuman Creek which empties into the North Saskatchewan. The fore-shore, apart from the open sandy beaches, is more or less marshy and there are extensive bog-rush beds and lesser areas of bullrush at various places reaching their greatest development in the many bays.

Wabuman Lake is not noted for its duck-shooting, but a considerable number of sportsmen shoot there, possibly attracted by the beauties of the lake and its surroundings rather than by the size of the bags that may be obtained. Goose Quill Bay in the south-east corner is said to give the best sport. This shallow bay is grown up with tall rushes and contains a number of open lagoons and channels. There is said to be always a certain amount of shooting in this bay and frequently excellent flight-shooting, the ducks coming chiefly from Low Water Lake to the south.

LAC ST. ANNE, ALBERTA

Lac St. Anne, similar in its general appearance to Lake Wabuman, is slightly shallower, thirty-two feet being the maximum depth. Alberta Beach at the east end is a very popular summer resort offering good fishing for pike, pickerel and perch during the summer months and duck shooting in the autumn. The shores are part sand beach and part mud; the water is shallow for some distance out from the shore and an almost continuous belt of bog-rush in some places extends into the lake in the form of long points. This growth is interrupted in places by beds of tules and phragmites. Around the greater part of the lake is a grassy flat of varying width between the marsh growth and the brush.

The west end of the lake is quite shallow and navigable only by canoe and skiffs. This is the best portion of the lake for duck-shooting as it is here that the marsh growth reaches its greatest development.

Island No. 1 is now connected with the northern mainland north of Section, 32, 54, 4, W5. This island is all rough high land grown up with brush and only a portion of the original poplar forest and spruce stands remains. There is a small quantity of hayland along the southern part and the entire island is surrounded by rushes. The water surrounding the island, except on the north

side, is shallow with peaty or muddy shores and is said to give the best duck shooting on the lake.

BITTERN LAKE, ALBERTA

On the evening of August 28th we took possession of an empty granary in the centre of an oatfield at Bittern Lake. South of us, tall poplars etched against an amber sky, marked the shore line of the shallow lake; between these slender trees and the oatfield, a grassy meadow, dotted with clumps of willow and poplar brush, marked the edge of cultivation. Before sunset a flock of Mallard, thought to number nearly 300, circled over a field of stooked wheat close to our camp, and, after making the circuit of the field several times, alighted and fed eagerly on the scattered grain. Later, in the dim evening dusk, I walked through the stubble, fascinated by the flocks of circling Mallard. Some flushed ahead of me, circled several times and eventually straightened out to fly towards the quiet lake through a gap in the shore line of brush. As darkness descended, merging fields, brush and lake into shadowed harmony, still could be heard from many points at once, the whistle of cleaving wings high in the still air, and the roar of rising flocks which my wanderings had disturbed.

Next morning it was seen that the poplar bluffs and meadows swarmed with migrants. The following species were noted: Sharp-shinned Hawk, Downy Woodpecker, Kingbird, Lincoln's Sparrow, White-throated Sparrow, Swamp Sparrow, Savannah Sparrow, Chipping Sparrow, Warbling Vireo, Yellow Warbler, Tennessee Warbler and Redstart.

Bittern Lake being centrally situated, in respect to other lakes of the region which were to be inspected, we camped here for ten days. The usual program provided for an early morning start and a return to camp in the evening. Thus memories of Bittern Lake are centered on painted sunsets, and Mallards flying over the stubble field—circling, hesitating, swooping down, sometimes to alight, more often to sheer off and repeat the manœuvre in some other part of the field. One such evening will never be forgotten. All day a cold wind had rattled amongst the poplar leaves and rain threatened. About 7.00 p.m. the western sky line cleared and the sun dropped below the horizon in blazing radiance. Coming horizontally from the lifted edge of the rain-clouds a flood of sunshine played like a searchlight on the stubble and burnished each stook a fairy gold. Later as we walked towards the beach the sky still held an amber after-glow, and, overlaid above the now dim, misty shore across the lake, glowed tenuous streamers of dusky cinnabar. Nor shall we forget the bands of Hutchin's Geese, seen for the first time that evening, which flew down the lake and alighted in the shallows out in front of the brush where we lay concealed. On this evening also Lapland Buntings first appeared lying close in the short prairie grass. In the days following they became quite common.

Bittern Lake is surrounded by flat or gently rolling prairie, partly under cultivation and partly hay meadows dotted with clumps of willow, poplar and balm of gilead. The lake is shallow and alkaline; there is no marsh growth on the shores and little weed growth suitable for duck feed. The beach at high water is of three types, sand and stone, clay, and sand or sandy loam covered with grass. In August, 1922, the water had receded, leaving bare a wide stretch of the gumbo lake bottom round the entire lake.

Owing to the scarcity of natural food this is not a particularly good nesting ground for ducks, but early August usually sees a congregation of locally bred Mallards which find their food on the stubble and use the lake as a resting place. A few Canada Geese nest on the islands and there is some early goose shooting before the northern birds arrive. One small island is occupied yearly by a considerable colony of California Gulls.

BATTLE LAKE, ALBERTA

Battle Lake, the headwaters of the Battle River, in Tp. 46, 21, W5, is beautifully situated between timbered hills which in some places rise abruptly from the water's edge. At the south end of the lake is a wide muskeg flat between the hills, and through this the Battle River, a diminutive stream, takes its leisurely course, Much of the original forest, both on this flat and the hills, consisted of spruce and, to a lesser extent, pine and tamarack. Most of this timber has either been logged off or burnt off and deciduous forest now predominates. The shores of the lake are sandy, the bottom hard and the weed growth comprises only bog-rush and splatter dock, forming more or less of a continuous belt along the shore.

A considerable portion of this long narrow lake was inspected on August 27th, 1922, and the only ducks noted were two Lesser Scaup and a brood of Mallard.

On August 26th, 1922, we found a pleasant camping ground in a poplar bluff. Below us lay the deep, narrow lake, richly blue, and shadowed by the timbered, spruce-crowned hill high above the opposite shore. Nearby we found a small muskeg wherein were clumps of spruce, jack-pine, birch, alder and poplar, deep moss, fallen timber and small grass patches. Here we discovered four Spruce Grouse and several Boreal

Flickers but the expected Hudsonian Chickadees we did not see.

BIG HAY LAKE, ALBERTA

Big Hay Lake was formerly much frequented by sportsmen and famous for its duck shooting. I visited this lake on September 1st, 1922, the first day of the duck season and did not hear a shot fired. Ducks rested on the lake and the lake shore in thousands and were relatively free from molestation owing to the wide margin of mud which completely encircled the lake. As I walked along the shore as close to the water's edge as possible great flocks of ducks would rise from the mud to fly only a short distance and settle on the lake.

Big Hay Lake was in September, 1922, about half its former size, owing to drainage operations and the dry summers of previous years. The original shore of the lake—a more or less wooded bank, six or eight feet in height—was then half a mile from the water's edge at the south end of the lake and probably two miles distant in some parts of the north end. The intervening flat was grown up with wild hay and this is cut by the German and Galician residents. The islands were connected with the mainland by wide, grassy covered flats. The season's high water was shown by a belt of bog-rush which at the time of our visit was one hundred yards more or less from the water's edge. Ducks undoubtedly find conditions in this lake to their liking and it is probable that decoy shooting would produce good bags. At the present time this form of sport is not much practiced owing to the vogue for shooting Mallard in the stubble field which probably constitutes three-quarters of the duck-shooting in central Alberta.

ISLE LAKE, ALBERTA

Since the opening of the Jasper Highway to Entwhistle, Isle Lake has become a popular shooting and fishing resort. Duck Shooting is excellent so also is angling for pike, pickerel and perch. The lake is beautifully situated amongst rough hilly country covered with brush and poplar timber. The shores are chiefly sandy or stony and there is an almost continuous belt of bog-rush of varying width round the entire lake. At the extreme east end is a considerable area of rough hayland adjoining the lake. The water is clear and purified by a number of small spring creeks. The Sturgeon river flows out of the east end and empties into Lake St. Anne.

Ducks are evidently attracted by the abundant growth of Potomogetons. While inspecting this lake on September 22nd, 1922, I found windrows of these duck weeds on the beach and among them two species of molluscs in enormous numbers.

Probably the best shooting on the lake is from the islands situated in the narrows in the north-east portion of Tp. 53, 6, W5. There are four islands, seemingly much closer together than indicated on the township plan. Two of these are timbered and afford good camping grounds and two are open and marshy with a few patches of brush. Apparently two of these islands are situated in the east half of Section 26, Township 53.

Another point that affords good shooting is the north-west quarter of Section 11, 54, 5, W5, This adjoins the Sturgeon River where it leaves the east end of the lake. A wooden bridge crosses the river at this point and is a favourite stand for flight shooting as the ducks pass to and from Lake St. Anne. The shores are flat and bordered with bullrushes and sedges. Farther inland is a thick growth of sedges. The balance of the quarter is chiefly spruce muskeg with stands of poplar on the higher portion.

The fractional south-east quarter of Section 26, 53, 6, W5, (1.7 acres) comprises the extreme end of a marshy, timbered point south of the islands referred to above. This fraction should afford good flight-shooting.

The fractional north-west quarter of Section 22, 53, 6, W5, and the north half of the south-west quarter is rough land partly brush and partly poplar timber—the shore-line sandy and stony and outlined with bog-rush.

LAC LA NONNE, ALBERTA

In the autumn of 1922, I reached Lac La Nonne on September 23rd by car from Seba Beach, via Lac St. Anne, a distance of 50 miles, part of which was over poor trails with several long stretches of heavy sand. Later we learned of a good road to the east end of the lake from Morrinville, 37 miles east.

Lac La Nonne is a miniature of Lac St. Anne or Lake Wabuman and, like those lakes, is surrounded by rough wooded country. The bottom is of hard sand, the south and east shores chiefly sandy and the north and west shores muddy. Bog-rush grows thickly practically all round the shore and there are occasional beds of tule and phragmites. The water is pure and clean except in the summer months when it is full of the fine algæ that are common in the lakes of this region. The maximum depth is said to be 110 feet. Two small creeks enter the lake, one draining Majeau

Lake to the west and the other draining Goose Lake to the south. White-fish, pike, pickerel and perch are found in the lake and large bags of the last three named are taken by anglers.

On September 23rd large flocks of Scaups and many broods of Golden-eye were seen, all remarkably tame, and in the evening a fair flight took place. Lac La Nonne is an ideal recreation ground, offering good camping places with plenty of clear water and dry wood, while both fishing and duck-shooting are excellent on practically every portion of the lake

MANAWAN LAKE, ALBERTA

This is a shallow, marsh-fringed lake lying about 36 miles north of Edmonton and much frequented by sportsmen from the city. The surrounding country is flat—open hay land on the west and south sides with occasional poplar bluffs. The east and north shores are thickly wooded about 150 yards back from the edge of the marsh. Much of the arable land is under cultivation, the farmers of the district being chiefly French Canadian.

At the south end of the lake the marsh area is extensive—bog-rush beds cut through by numerous open channels. I camped on the night of September 19th, 1922, on Section 30, 56, 25, W4, close to the edge of the marsh. Bird-life was very abundant. Great mixed flocks of Brewer's and Rusty Blackbirds accompanied by a few Yellowheads arose in clouds from the rushes as I passed along the shore. Lesser Yellow-legs, Baird's and Pectoral Sandpipers fed along the muddy shore and Wilson's Snipe were unusually abundant in the drier portions of the marsh. Ducks of various species rested in the sheltered lagoon during the afternoon and late in the evening came a flight of Mallard to the stubble fields in the south.

(*To be continued*)

AN ANNOTATED LIST OF THE MAMMALS OF AWEME, MANITOBA

By STUART CRIDDLE, Treesbank, Manitoba

THE information presented below has resulted from a study begun many years ago but which lack of time has much prolonged. The district involved comprises an area of approximately 130 square miles. It is bordered on the west by the Assiniboine river, with its accompanying fringes of woods, bogs and creeks; on the south by the Canadian Pacific railway running through Stockton and Treesbank, north of which is the mouth of the Souris river where it runs into the Assiniboine. In the east are a series of sand dunes, among which I have chosen as a boundary, the prominences named by the early fur traders as the Devil's Hills. These sand dunes support clumps of white spruce, paper birch and scrub oak as well as innumerable small shrubs, while between the ridges are thickets of aspen poplar, willow and isolated clumps of spruce. These flats between the ridges are low-lying and still provide an occasional small pond. To the north-east there is a large bog covered by a thick stand of larch, scattered black spruce, dwarf birch, willows and other shrubs. Through the middle of this bog runs Epinette creek, originating on the northern boundary of the area from a series of small lakes. This area is all within what is known as the Spruce-woods Timber Reserve. It has also been appropriately set aside as a game preserve, though little, as yet, has been done to protect the animals within from hunters and trappers. The central portion of the area is divided between open prairie and poplar woods, only a small portion near the western extremity being under cultivation. It is near the eastern margin of this cultivated area that my house stands.

In collecting material for this survey I have been much assisted by my brothers Norman, Evelyn and Talbot. And for the determination of the specimens I owe a deep debt to members of the United States Biological Survey; more especially to Dr. C. Hart Merriam; Dr. Hartley H. T. Jackson; and Mr. Vernon Bailey. During the period occupied in writing up the present account I have been aided by a grant from the National Research Council of Canada. In arrangement the list follows "A List of North American Recent Mammals, 1923," by Gerrit S. Miller Jr., Bulletin 128, U.S. National Museum, Washington, 1924.

ORDER INSECTIVORA

FAMILY SORICIDAE

Genus *Sorex*. Linnæus.

Sorex cinereus haydeni (Baird).—HAYDEN SHREW.

Usually common. The specimens taken in woods and swamps are, as a rule, slightly larger and darker than those from the uplands or open prairie; these forms however, intergrade.

Sorex arcticus arcticus Kerr.—SADDLE-BACKED SHREW.

Very rare; found in the larch swamp west of here.

Sorex arcticus laricorum Jackson.—SOUTHERN SADDLE-BACKED SHREW.

Tolerably common. Found in the larch swamps and along the river banks, while an occasional specimen has been taken on the prairie.

Sorex palustris palustris Richardson.—WATER SHREW.

Very rare. Only taken in the small northwest larch swamp bordering the Assiniboine river.

Genus *Microsorex* Couse

Microsorex hoyi hoyi (Baird).—PIGMY SHREW.

Rare. No special habitat can be given, the animal having been taken close to the Assiniboine river and in small isolated poplar bushes on dry uplands.

Genus *Blarina* Gray

Blarina brevicauda brevicauda (Say).—MOLE SHREW.

Tolerably common, especially along rivers and in larch swamps. Occasionally taken in upland situations.

ORDER CHIROPTERA

FAMILY VESPERTILIONIDAE

Genus *Myotis* Kaup

Myotis lucifugus lucifugus (LeConte).—LITTLE BROWN BAT.

Rare. I have seen several that I thought to be this bat but have no definite determinations.

Genus *Lasionycteris* Peters

Lasionycteris noctivagans (LeConte).—SILVER-HAIRED BAT.

Tolerably common; more so in late spring and early autumn.

Genus *Nycteris* Borkhausen.

Nycteris borealis borealis (Müller).—RED BAT.

Fairly common; often observed flying over the rivers and about the woods at dusk.

Nycteris cinerea (Beauvois).—HOARY BAT.

Tolerably common. Seldom a summer passes without a few of there large bats being seen.

ORDER CARNIVORA

FAMILY URSIDAE

Genus *Euarctos* Gray

Euarctos americanus americanus (Pallas).—BLACK BEAR.

Rare. There are still a few to be found in the game preserve along the margin of the larch bog; occasionally one wanders out along the Assiniboine river in search of food.

FAMILY PROCYONIDAE

Genus *Procyon* Storr

Procyon lotor lotor (Linnæus).—RACCOON.

Very rare. I have only three records as follows: November 7, 1883, March 11, 1911, and August 1, 1927. These were taken along the Assiniboine river, where the animal is known to breed.

FAMILY MUSTELIDAE

Genus *Martes* Pinel

Martes americana (Turton).—PINE MARTEN.

Extremely rare. My only record is December, 1910, and I think the animal was a straggler passing through the district.

Genus *Mustela* Linnæus

Mustela cicognanii cicognanni Bonaparte.—BONAPARTE'S WEASEL.

Common, though not so much so as it was a few years ago. While this weasel travels long distances across the prairie it prefers those areas in which a certain amount of protection is afforded by trees and underbrush.

Mustela rixosa rixosa (Bangs).—LEAST WEASEL.

Tolerably common though seldom seen. Its tracks, however, indicate that it is much more prevalent than might be suspected. It is rather generally distributed though it seems to prefer thick grassy meadows that provide shelter and meadow mice.

Mustela longicauda longicauda Bonaparte.—LONG TAILED WEASEL.

Common, though owing to its often travelling long distances its prevalence is often over estimated. However, it seems to be holding its own fairly well, which is more than can be said of a majority of our fur bearing animals.

Mustela vison lacustris (Preble).—HUDSON BAY MINK.

Tolerably common. It is rather remarkable, with the persistent trapping, that the mink still survives over most of its original range. The high price offered for its fur, however, places it in constant danger of extermination.

SUBFAMILY LUTRINA

Genus *Lutra* Brisson

Lutra canadensis canadensis (Schreber).—CANADA OTTER.

Very rare; a few may still remain along Epinette creek in the game preserve but trapping, which has been carried on even there, has seriously jeo-

pardized the few animals remaining in southern Manitoba.

SUBFAMILY MEPHITINAE

Genus *Mephitis*. Geoffroy and Cuvier

Mephitis hudsonica (Richardson).—BROAD-STRIPED SKUNK.

Common. The number of skunks in the district varies from year to year, due to a distemper-like disease which, at times destroys great numbers. The animals seem to prefer the open wooded districts though often retiring to the denser woods to make their winter homes.

SUBFAMILY TAXIDIINAE

Genus *Taxidea* Waterhouse

Taxidea taxus taxus (Schreber).—BADGER.

Common, but now, owing to the increased value of its pelt, in grave danger of extermination. This value has increased from two or three dollars offered a few years ago, to as much as forty to-day. Fortunately the badger has a very wide range, being found wherever its favourite food, mice, gophers, etc., is prevalent.

FAMILY CANIDAE

Genus *Vulpes* Oken

Vulpes regalis Merriam.—RED FOX.

Very rare. It would seem that the bounty offered for young wolves had acted much more severely on the foxes than on the wolf. Fifteen or twenty years ago the fox was quite common in the sand dune country, to-day it is practically extinct.

Genus *Canis* Linnaeus

Canis latrans Say.—COYOTE.

Common. In spite of the wasteful system of offering bounties for their destruction and the persistent trapping and shooting to which they are subjected for their fur, these wolves are maintaining their numbers to a remarkable extent.

Canis occidentalis (Richardson).—TIMBER WOLF.

Extremely rare and probably extinct in the southern part of the province. A fine example passed through the district in December, 1910, and was shot near Carberry. It had probably strayed down from the north.

FAMILY FELIDAE

Genus *Lynx* Kerr

Lynx canadensis canadensis Kerr.—CANADA LYNX.

Rare, though previously common in the thickest woods where it used to rear its young. The animal wanders far afield when bush rabbits are scarce and it is probably due to this that an odd individual still wanders through the district.

Lynx rufus rufus (Schreber).—NORTHERN BOB-CAT.

Extremely rare and not definitely determined; possibly referable to *uinta* Merriam. One trapped in the north-west larch swamp by H. P. McLeod during the winter of 1908 constitutes my only record.

ORDER RODENTIA

FAMILY SCIURIDAE

Genus *Marmota* Blumenbach

Marmota monax canadensis (Erxleben).—WOODCHUCK.

Rarely observed, though it evidently breeds along the Assiniboine river, a female captured by my brother Talbot and H. N. Clark showing unmistakable signs of having recently suckled young.

Genus *Citellus* Oken

Citellus franklinii (Sabine).—FRANKLIN GROUND SQUIRREL, or SCRUB GOPHER.

Common. This rodent hibernates for nearly eight months, yet does more harm during the period of its activity than any other member of the genus.

Citellus richardsonii (Sabine).—RICHARDSON GROUND SQUIRREL, or FLICKER-TAIL.

Rare in the district, though common a few miles away.

Citellus tridecemlineatus tridecemlineatus (Mitchill).—STRIPED GOPHER.

Abundant throughout the district, yet so unobtrusive that its burrows and the grain or grass cut around them, are often the only indication of one being present.

Genus *Eutamias* Troussart

Eutamias minimus borealis (Allen).—NORTHERN CHIPMUNK

Common. A bright, conspicuous, little animal. It usually occurs along the margins of woods, especially where wild cherries are to be obtained, or where the woods are adjacent to a grain field.

Genus *Tamias* Illiger

Tamias striatus griseus Mearns.—GRAY EASTERN CHIPMUNK.

Tolerably common. This large chipmunk is usually met with in the woods along the rivers. Its habits resemble those of the northern chipmunk though it has a much more retiring nature.

Genus *Sciurus* Linnaeus

Scirus hudsonicus hudsonicus (Erxleben).—RED SQUIRREL.

Common, though fluctuating greatly from year to year. This animal is found in all the heavier wooded portions of the district. There is a

marked migration of young during August and September.

SUBFAMILY PTEROMYINAE

Genus *Glaucomys* Thomas

Glaucomys sabrinus canescens Howell.—PALE FLYING SQUIRREL.

Tolerably common among the heavier timber, especially along the rivers. Occasionally migrates to the smaller upland woods.

FAMILY GEOMYIDAE

Genus *Thomomys* Wied

Thomomys talpoides rufescens (Wied).—POCKET GOPHER.

Common. Found over most of the open and semi-wooded parts of the district and has become fully adapted to the advantages of cultivated crops where it is multiplying and spreading.

FAMILY HETEROMYIDAE

Genus *Perognathus* Wied

Perognathus fasciatus fasciatus (Wied.)—BANDED POCKET MOUSE.

Common. This is the smallest of our local rodents and while seldom seen, really occurs over all the more sandy portions of the district.

FAMILY CASTORIDAE

Genus *Castor* Linnaeus

Castor canadensis canadensis Kuhl.—CANADA BEAVER.

Tolerably common. Up to 1905 the beaver was extremely rare but since then it has steadily increased. Trapping has again reduced the animals but with the policy inaugurated by the provincial government, there is reason for hoping that this interesting creature will be permanently preserved.

FAMILY CRICETIDAE

Genus *Onychomys* Baird

Onychomys leucogaster leucogaster (Wied).—MAXIMILIAN GRASSHOPPER MOUSE.

Tolerably common. These large short-tailed mice are seldom seen, but they seem to be fairly evenly distributed over the open and partly wooded districts.

Genus *Peromyscus* Gloger

Peromyscus maniculatus bairdii (Hoy & Kennicott).—WHITE-FOOTED MOUSE.

Abundant and quite reconciled to modern farm conditions. They are to be found on and around all grain fields, in farm buildings and when possible, in the farm house. The only place where they have not been discovered is in wet situations.

A paler form of this mouse is found on the drifting sand dunes that compose the Devil's Hills.

Genus *Clethrionomys* Tilesius

Clethrionomys gapperi loringi (Bailey).—PRAIRIE RED-BACKED MOUSE or VOLE.

Abundant. Frequenting all the wooded or shrubby sections. Very injurious to fruit trees from which it gnaws the bark in winter time.

Genus *Microtus* Schrank

Microtus pennsylvanicus drummondii (Audubon & Bachman).—DRUMMOND MEADOW MOUSE.

Abundant. These mice are particularly fond of brome and blue-grass patches, which in winter time they often completely eat over. There is some variation in size, individuals from swampy places being slightly smaller than upland specimens.

Microtus minor (Merriam).—LEAST MEADOW MOUSE or VOLE.

Very common; chiefly confined to the open country or the margins of low bushes, but now and then entering the open woods or wet meadows when these latter furnish the necessary provender such as dandelion or other succulent roots, which they require for their winter stores.

Genus *Ondatra* Link.

Ondatra zibethica cinnamomina (Hollister).—MUSKRAT.

Tolerably common; frequenting the rivers and small ponds or lakes. Persistent trapping, of recent years, has much reduced it in number.

FAMILY MURIDAE

Genus *Rattus* Fisher

Rattus norvegicus (Erxleben).—HOUSE-RAT.

Common in the vicinity of human habitations. From these it wanders to the grain fields in summer time but is obliged to return for shelter to the warmer buildings in winter. It was first recorded in 1914.

Genus *Mus* Linnaeus

Mus musculus musculus Linnaeus.—HOUSE-MOUSE.

Abundant; wandering out into the fields in summer time, but like the house rat, returning to the buildings for shelter in winter time.

FAMILY ZAPODIDAE

Genus *Zapus* Coues

Zapus hudsonius hudsonius (Zimmerman)—NORTHERN JUMPING MOUSE.

Very rare. Taken only in the north-east larch bog.

Zapus hudsonius campestris Preble.—PRAIRIE JUMPING MOUSE.

Common. Mostly met with in the margins of woods, though also taken in the grain fields at harvest time.

Zapus princeps minor Preble.—LEAST JUMPING MOUSE.

Rare. This species has only been taken in the thick prairie grass near the western boundary of the area.

FAMILY ERETHIZONTIDAE

Genus *Erethizon* F. Cuvier

Erethizon dorsatum dorsatum (Linnaeus).—PORCUPINE.

Very rare. Occasionally found in the poplar woods to the west and south, and in the spruce woods in the east and north.

FAMILY LEPORIDAE

Genus *Lepus* Linnaeus

Lepus townsendii campanius Hollister.—JACK RABBIT.

Common. The first one actually secured was in 1890, though odd animals had been present for a number of years previous to that time. They have since become common and have remained so, with slight fluctuation, until the present time.

Lepus americanus phæonotus Allen.—MINNESOTA SNOWSHOE RABBIT, or BUSH RABBIT.

Common but fluctuating. A few years ago they were super-abundant but of late they have become greatly reduced in number.

Genus *Sylvilagus* Gray

Sylvilagus floridanus similis Nelson.—NEBRASKA COTTON-TAIL.

I have only one record, and that is of an animal caught on the farm of Mr. N. J. Clark three miles north of Treesbank, on February 11, 1914.

FAMILY CERVIDAE

Genus *Cervus* Linnaeus

Cervus canadensis manitobensis Millais.—PRAIRIE ELK or WAPITI.

Tolerably common until 1887, now extinct in the district.

Genus *Odocoileus* Rafinesque

Odocoileus hemionus hemionus (Rafinesque).—MULE DEER.

Rare. Fifteen years ago these deer frequented all the sand dune country, they are now restricted to my eastern margin north of Glenboro. The remnant are in immediate danger of extinction.

Odocoileus virginianus borealis (Miller).—NORTHERN WHITE-TAILED DEER or FLAG-TAIL.

Common. These deer have taken the place of the mule deer and they are steadily becoming more widespread.

Genus *Alces* Gray

Alces americana americana (Clinton).—MOOSE.

Tolerably common. These fine animals have held their own in the north-east larch swamp for many years past and with adequate protection the species may be retained in our midst indefinitely. From their stronghold in the swamp they occasionally wander out into the nearby woods or along the Assiniboine river.

MARINE MOLLUSCS COLLECTED BY FRITS JOHANSEN IN THE MARITIME PROVINCES OF CANADA IN THE AUTUMN OF 1926

By W. H. DALL

I. Low tide in Baie Ste. Anne, Miramichi, New Brunswick, August 25, 1926:

Ilyanassa obsoleta Say
Littorina rudis Don.

II. Escuminac Point, New Brunswick, middle of August, 1926 (Beach and Shorewater):

Mytilus edulis Linnaeus
Mya arenaria Linnaeus
Spisula similis var.
Clidophora gouldiana Dall
Buccinum undatum Linnaeus
Tritia trivittata Say
Littorina litorea Linnaeus
Littorina rudis Don.
Crepidula fornicata Lamarck

III. Richibucto Harbor, New Brunswick, August 27-29, 1926 (Beach and Shorewater):

Mya arenaria Linnaeus
Macoma balthica Linnaeus
Modiolus demissus Dillwyn
Littorina litorea Linnaeus
Littorina rudis Don.
Ilyanassa obsoleta Say
Tritia trivittata Say
Mytilus edulis Linnaeus (young)
Gemma gemma Totten

IV. Beach at Richibucto Head, New Brunswick, August 30th, 1926:

Spisula similis Say
Nucella lapillus Linnaeus

Littorina litorea Linneaus

V. Buctouche, New Brunswick, August 31, 1926 (Beach and Shorewater):

Venus mercenaria Linnaeus
Ostrea virginica var. *borealis* Say
Modiolus demissus Dillwyn
Crepidula fornicata Lamark

VI. Low tide at Geddes Point, New Brunswick, September 1, 1926:

Crepidula plana Say
Buccinum undatum Linnaeus
Acmaea testudinalis Linnaeus
Littorina litorea Linnaeus
Mya truncata Linnaeus
} all young

VII. Beach at Dixon Point (near Buctouche), New Brunswick, September 1, 1926:

Modiolus modiolus Linnaeus
Modiolus demissus Dillwyn
Mytilus edulis Linnaeus
Ostrea var. *borealis* Say
Venus mercenaria Linnaeus
Spisula similis Say
Littorina litorea Linnaeus
Eupsira heros Say (young)

VIII. Beach at Cocagne Harbor, New Brunswick, September 2nd, 1926:

Crepidula fornicata Lamarck
Crepidula plana Say
Ilyanassa obsoleta Say

IX. Beach at Grant (between Shemagoe Inlet and Cape Tormentine), New Brunswick, September 8th, 1926:

Crepidula fornicata Lamarck
Crepidula plana Say

X. Beach at Cape Tormentine, New Brunswick, September 10th, 1926:

Spisula similis Say (young)
Tritia trivittata Say (fragment)
Lacuna vincta Turton

XI. Malpeque Bay, Prince Edward Island, September 13-14, 1916 (Shorewater):

Mya arenaria Linn. (young)
Littorina rudis Don. (young)

XII. Shore of Pugwash Harbor, western Nova Scotia, September 19th, 1926:

Euspira heros Say

XIII. Beach at Scott Bay, Nova Scotia, October 2, 1926:

Macoma balthica Linnaeus
Naucella lapillus Linnaeus
Littorina litorea Linnaeus
Euspira heros Say
Tritia trivittata Say
Littorina rudis Don.

XIV. Hall's Harbor, Nova Scotia, October 4, 1926 (from lobster traps):

Chrysodomus decemcostatus Say
Buccinum undatum L. (dwarfs)

XV. Beach at head of St. Mary's Bay, Nova Scotia, October 10, 1926:

Mya arenaria Linnaeus
Macoma balthica Linnaeus
Littorina litorea Linnaeus
Littorina palliata Say
Tritia trivittata Say
Nucella lapillus Linnaeus

XVI. Beach at mouth of Weymouth River, Nova Scotia, October 11, 1926:

Euspira grœnlandica Moeller
Buccinum undatum Linnaeus

NOTE.—Stations Nos. I-XII (arranged from west to east) are localities in the Gulf of St. Lawrence; Nos. XIII-XVI (arranged from north to south) in the Bay of Fundy.—F.J.

PELLETS OF HAWKS AND OWLS ARE MISLEADING

By ALLAN BROOKS

IN *The Canadian Field-Naturalist* for April, 1929, Mr. Ralph D. Bird gives a detailed summary of the food of the Great Horned Owl solely from the examination of their pellets.

That this is an entirely untrustworthy method of analysis anyone who has kept a hawk or owl in captivity and studied their feeding habits and reactions must know. Yet others have arrived at the value of certain hawks and owls from similar evidence.

The investigator chosen to work on the Bob-White situation in Georgia exonerated that deadly Quail-killer, the Marsh Hawk, solely on the evidence of one thousand or so pellets picked up at the hawk's roosting places.

The fact is that only where fur or other absolutely indigestible matter is swallowed is any pellet thrown up. Feed a hawk or owl a bird that it can pick or strip the skin from and no pellet results. So that only where bird remains are involved in mammal fur in the captor's stomach is there as a rule any evidence of birds being eaten from pelletal examination.

In other words, a raptor might be feeding almost entirely on poultry or game birds. Yet

its pellets would only show evidence of this if it had eaten a mammal at the same time, while every mammal would surely yield the evidence in a pellet.

The examination of the food of raptors in America has been left almost entirely to the activities of laboratory experts and little of the life habits of species investigated has been published.

The only published reference to the digestive action that I can find is in a footnote on p. 235 of Vol. II in Forbush's *Birds of Massachusetts*, which is as follows:

"In a recent letter, Mr. C. L. Hauthaway gives a detailed account of a series of interesting observations and experiments with Snowy Owls. A number of these birds when shot had in their stomachs only the remains of mice, but they were shot in the act of killing ducks. He found by experiment that Snowy Owls tore away the skin and feathers of their bird victims, eating only flesh and no bones, thereby making it a difficult task for the investigator to identify bird-remains in their stomachs, while, on the other hand, they swallowed skin, bones and fur of mice thus making it easy to identify the remains of that part of their food. Should this prove to be their usual method we may have to revise somewhat our estimate of the economic status of the species as determined by stomach examinations."

I have before me Mr. Hauthaway's original letter with permission to publish it which I intend to do; his captive owls only ejected pellets where mice were swallowed or when indigestible matter was forcibly fed to them.

From personal examination of a large number of Great Horned Owl's stomachs, I have found nothing smaller than a *Neotoma* in the mammal line and of Quail among birds.

AN EARLY LIST OF ONTARIO BIRDS

By JAMES L. BAILLIE, Jr., Royal Ontario Museum of Zoology

OCCASIONAL references to birds appeared in many of the writings of the early French and English explorers and missionaries in what is now the province of Ontario from the time of its first discovery in 1610 to the beginning of the nineteenth century but what was probably the earliest attempt to list the birds of the province was made by Robert C. Gourlay in 1822. This list appeared as Sketch XIV (pages 171-175) in Volume I of Gourlay's *Statistical Account of Upper Canada, Compiled with a View to a Grand System of Emigration*, published in London, England, on January 1, 1822.

Gourlay lived in Upper Canada (Ontario) for several years. His book deals with the history of the province, natural divisions, settlement, climate, soil, minerals, natural and cultivated productions, fauna, constitution, government, taxes and revenue, commerce, militia, religion, professions, trades, and character, manner and customs of the inhabitants.

Sketch XIV, dealing with the birds, is reproduced below. 48 species are listed, from which 37 species are fairly recognizable by the names given. Comments are made on 12 species and of these the Ruffed Grouse, Wild Turkey, Wild Goose, Wood Duck, Robin, Loon and Whippoorwill are fairly well described. No localities are mentioned but the list is atrributed to "Upper Canada" and the birds are listed by the common names in general use at the time.

"A GENERAL list of the native Birds of Upper Canada, not technically classed or described, but enumerated by their popular names, in the common language of the country, is as follows: the turkey, goose, swan, duck, brant, water hen, partridge, quail, pigeon, robin, eagle, hawk, raven, crow, vulture, owl, whipperwill, bat, barn swallow, chimney swallow, martin, lark, heron, pelican, loon, gull, snipe, pluver, diver, kingfisher, blackbird, bluebird, blue jay, mockingbird, kingbird, woodpecker, woodcock, redbird, cuckoo, sawyer, sparrow, yellowbird, snowbird, phebe, groundbird, hangbird, wren, and hummingbird.

"*Wild Turkeys* do not frequent the bank of the St. Lawrence, or the north shore of Lake Ontario, but are numerous from the head of that lake, westward and southward. [In a footnote he says 'They are now scarce: they weigh from 16 to 30 lbs.—R.G.']. They differ very little from domestic turkeys, except that they are generally larger.

"*Wild Geese* are migratory birds, and can hardly be said to belong to any particular region, unless it be the northern islands and shores, where they lay their eggs and rear their goslings. In their annual tours to and from those shores and islands, they visit this country, and are killed and taken in considerable numbers.

"*Ducks* of several species are found in plenty on the margin of the lakes, creeks and streams. Among other species there is one called the Wood Duck, from its frequenting the woods, and

perching and nesting on the branches of trees. In shape and size it agrees with other ducks; in flavour, its flesh is superior, as it feeds less on fish. Its plumage is variegated and brilliant.

"The *Partridge of Canada* is the same as in New England, but in Pennsylvania, is known by the name of pheasant. He is not so large as the domestic hen, has a crest on his head, and a ruff on each side of the neck, varied with black stripes, and raised or depressed at pleasure; the plumage in general is brown, shaded with a ferruginous colour, and marked with black lines and bars, the colour of the under part is light, striped with brown; the tail is large, and when expanded resembles a fan, of an orange ground, delicately lined and barred with black, and having near the end a band of ash colour, another of black, and a white border; the legs and feet are booted with white feathers to the toes. The female is smaller than the male; has neither crest nor ruff, and is sometimes mistaken for a different species of bird. The cock partridge has a singular habit of drumming, as it is termed. He stands on a stump or log, and begins to beat with his wings once in about two seconds of time, repeating the beats quicker and quicker, until they run into one undistinguishable sound continued for a minute or two. It is often heard half a mile, and guides the listening hunter to his game. The flesh of the partridge is white and delicate, but rather dry.

"The *Quail of Canada* is known by the same name in New England; but in Pennsylvania is named the Partridge.

"The *Canadian Robin* is the same as that in the United States, but larger than the English robin, not so red on the breast, and has some black feathers on the head and tail. The robin of this country appears to be a species of the English thrush.

"The *Loon* is a water fowl, of a dark colour, with some specks of white. His feet are stiff, and not adapted to travelling on land. He is a diver, so quick and vigilant, that he is not easily shot; lives most of the time in the water, but sometimes flies. His flight is generally low, frequently brushing the water. At certain periods, usually before a storm, he screams, in a shrill plaintive voice, like some person in distress; and is neither valuable nor mischievous, except in feeding on fish.

"The *Whipperwill*, or Whip-poor-will, is a bird of the evening, seldom seen or heard at any other time. His colour is dark, with whitish stripes; his shape like that of a hawk; his bill hooked, and his wings formed for swiftness. His appearance in the spring was considered by the Indians an indication of the proper season for planting their corn. He will sit on some fence, log, or stone, near a house, and repeat during a whole warm evening, a plaintive sound, imitating the three syllables of the word by which he is named.

"The *Mocking Bird*, or *Brown Thrasher*, a species of the thrush, imitates the notes of many other birds and some beasts.

"The *Sawyer*, or *Whetsaw*, is so named from the sound of his voice, which resembles the whetting of a saw.

"The *Swan* is a rare bird; but has been seen and killed on the margin of lake Erie.

"The *Heron*, vulgarly pronounced Hern has such an affinity to the crane, that I cannot ascertain from the information of observers, whether the latter exists here or not.

"The *Canadian Cuckoo*, is not the bird that bears that appellation in England, but has obtained the name here from an imitation of the sound of that word.

"Among a number of *Larks* the proper Sky Lark is not found.

"There are various species of Eagles, Hawks, Owls, Woodpeckers, Blackbirds, &c. and several small birds, without appropriate names. Most of the birds of this country reside here in summer only. In the autumn they resort to warmer climates, spend the winter there, and return in the spring."

RANDOM NOTES ON THE FLUCTUATION IN NUMBERS OF RODENTS AND GROUSE IN CANADA[1]

By P. A. TAVERNER, National Museum of Canada

OF LATE considerable interest has been taken in the periodic fluctuation in numbers of rodents and grouse and I have received several requests for information on the subject. It is being realized that these cyclic variations are more than local and have a deep bearing upon important economic questions. The data upon past variations are scattered and fragmentary and difficult to gather together for correlation. Much of them are unpublished and exist only in old notebooks or in fading memories, unattainable to

[1]Published with the permission of the Director, National Museum of Canada.

the research student. It would be well if all who can add to the history of such events would publish them, and as a beginning and example I herewith present a few notes from my own experience that I have sifted out in response to the above inquiries.

1917. At Shoal Lake, Manitoba (north of Winnipeg); on the Red Deer River, Alberta, between Red Deer and Steveville; at Mount Hector, near Banff; about Hazelton, British Columbia, and in Jasper Park, Alberta.

The outstanding feature of this season in these localities was the lack of all kinds of grouse. It was as marked in the protected areas of the National Parks as elsewhere and certainly could not have been caused by over-shooting. On the Red Deer River residents informed us that the previous fall there were plenty of "Prairie Chicken" (Sharp-tailed Grouse) but through the winter there had been an influx of large owls and hawks. In my Birds of the Red Deer River (*The Auk*, 1919) I attributed this scarcity of grouse to the raptores that had been forced out of the north by the scarcity of rabbits. I have since reconsidered the question and am inclined to think it was a confusion of cause and effect, and that the flesh eaters wandered widely because of the lack of all kinds of food. Over the whole of the territory rabbits were equally scarce and with the exception of a few cotton-tails on the lower Red Deer practically none were seen. Gophers (Ground Squirrels, *Citellus*) at Shoal Lake were far from common and we had to make special efforts to obtain specimens. On the Red Deer River they were more numerous but not as abundant as we found them in adjoining localities in 1920 when they were very common. The Large Hawks (*Buteo* and *Archibuteo*) were not suffering for lack of gopher food as was evidenced by the fragments and the large strong broods (from three to four young) in their nests. We did not particularly note the mouse conditions this season.

1920 and 1921. These summers were spent on the southern prairies of Alberta, Saskatchewan and Manitoba. Ground Squirrels were very numerous and generally distributed, so numerous that we ran over several daily on the roads with our car. Grouse were also plentiful, increasing to the autumn of 1921 when the best "Prairie Chicken" shooting of years was experienced generally. 1921, to July was spent in the vicinity of Lake Kutewagan and Last Mountain Lake, Saskatchewan, and rabbits were not common. A couple shot at the latter station had such immense sores that we declined even to pick them up, much less prepare them for specimens. I do not remember seeing any conspicuous number later in the season while touring Saskatchewan and Alberta. On the other hand, in 1921 rabbits were quite plentiful in the country south of the Cypress Hills, Saskatchwean. I have no data on the mouse condition these years.

1924. The summer of this year was spent on the north shore of the Gulf of St. Lawrence between Harrington and Natashquan. Mice or Voles of some kind were exceedingly numerous on the barren islands. The moss was almost honey-combed in places with their holes and their runways criss-crossed everywhere. Many could be seen dodging in and out as we walked along.

1925. The summer was again spent on the Red Deer River between Red Deer and Drumheller. Deer Mice (*Peromyscus*) were very common on the bare buttresses of the bad lands but other species of mice seemed scarce. Ground Squirrels were few. The effect of their scarcity on the large "Gopher Hawks" (*Buteo* and *Archibuteo*) was very noticeable. Instead of large strong broods of from three to four young as noted in the same region in 1917 when "gophers" were common, few nests contained more than one or two. Eggs to the full complement were usually laid and the hatch was normally successful, but as the young grew in size their numbers invariably reduced until seldom more than one or two were raised to flying stage. In nests watched the parents seldom brought more than one "gopher" a day and sometimes only a part of one. This was dumped down in the nest and no attempt at partition was made by the parent. The strongest young immediately pounced upon the supply and refused to give it up until it was consumed or until the consumer was satisfied. It followed that the weaker nestlings got little or nothing, grew weaker still and less able to obtain a share, while the strong waxed stronger. I think the final result was the strong devoured the weak as the latter steadily disappeared and no trace could be found of them or their remains in or near the nest. It was an interesting example of the heartless efficiency of natural processes In a time of famine these hawks did not raise a large family of half-starved weaklings, but only the optimum number that could be fed.

Grouse, except for the newly introduced Hungarian or Gray Partridge, were decidedly scarce. Only occasional Ruffed Grouse were met with in the bush of the river bottom and I saw but one brood of Sharp-tails all season. The single Sharp-tail taken, not of this brood, was in poor physical shape if not actually diseased.

1926. The summer of this year was spent at Belvedere, 60 miles northwest of Edmonton,

Alberta. The year previous was said to have have been a big rabbit year. We were informed that when they began to die they developed unnatural tastes and congregated about and ate of dead cattle and other carcasses. We did not see a single rabbit nor any fresh sign. Mice were also scarce and hard to trap. Great Gray and Richardson's Owls, which had been rather common and nested in the vicinity during previous years were not seen at all but Great Horned Owls were numerous. One nest of Saw-whet Owls was found containing three young. A week later the nest contained but one living owl, its two nest-mates with their heads eaten off, and one partly devoured Red-backed Mouse. Spruce Partridge, Ruffed and Sharp-tailed Grouse were at their low point.

1928. During the summer of 1928 mice, rabbits (Varying Hares) and grouse of all species were all very scarce on the north shore of the Gulf of St. Lawrence where we worked from Moisie Bay to Natashquan. Two days spent at Fox Bay, Anticosti Island, seemed to show similar conditions, though the only rabbit seen the whole season was at that point. The residents at Matamek, near Moisie, reported that they obtained less than half a dozen rabbits the winter before instead of their usual quota of several hundred. The same was true of Ptarmigan and only a few individuals were killed instead of considerable numbers. Spruce Partridge and Ruffed Grouse were very few. We saw less than half a dozen of either. Mice and shrews were also low. We had twenty traps out most of the time but rarely took more than three a day and many days none at all.

The residents say that last winter (1927-1928) was a good season for Red Foxes on the coast but there were none in the interior. In the absence of their usual food, numbers came to forage and glean at tide water and many were caught.

NOTES AND OBSERVATIONS

FIRST RECORD OF THE PROTHONOTARY WARBLER IN THE TORONTO REGION.—On May 19th, 1928, at Kettleby, Ontario, 35 miles north of Toronto, a party of ten Brodie Club members were afforded the rare opportunity of observing for the first time this southern warbler. It was first noticed in a sparsely wooded pasture at the border of a wet swampy area. At first sight the bird suggested a Yellow-throated Vireo, but the bright yellow head and neck and absence of wing-bars, besides the presence of white markings on the tail, soon dispelled all doubts as to its identity. The bird was remarkably silent and was not particularly active but hopped leisurely about through the trees, searching for its favourite food—insects.

The specimen, a fine female Prothonotary warbler, *Protonotaria citrea*, the first of this species to be secured in the Toronto region, and evidently the third for Ontario, is now in the writer's collection, and was secured as soon as the party had a satisfactory glimpse of the stranger.

The first record of this warbler was made by Dr. K. C. McIlwraith of Hamilton, who secured a female there on May 23rd, 1888.[1] The second specimen for the province was collected[2] by P. A. Taverner on May 19, 1913, at Point Pelee. In addition to the records mentioned above, a singing male was seen[3] by W. E. Saunders at London on May 30, 1920, and it has been seen at least once at Toronto[4] by J. Hughes Samuel, Toronto Island, May 13, 1900. Mr. Samuel states in his diary[5] that he watched this bird very closely for fully an hour, and had the satisfaction of seeing a second bird of this species put in an appearance during this period.

The members took advantage of the perfect weather on the following day, the annual field-day of the club, and were active from early morning to late afternoon, and a list of 96 species (seen in the immediate neighbourhood) was compiled. The day was full of interesting events and equally interesting observations, and though 21 species of warblers were seen, we were not favoured by seeing a second Prothonotary.—ROBT. W. LINDSAY.

[1]K. C. McIlwraith, *Auk*, July, 1888.
[2]P. A. Taverner, *Ottawa Naturalist*, Nov. 1914.
[3]W. E. Saunders, *Can. Field-Naturalist*, Nov. 1920.
[4]J. H. Fleming, *Auk*, Jan., 1907.

THREE OF JACK MINER'S TAGGED GEESE KILLED BY ONE MAN.—Each mail during the fall and winter brings reports of ducks and geese being killed that have been tagged here at the sanctuary. The most interesting letter received recently was one from a man in Commerce, Missouri, who killed three out of one flock, each bearing a tag placed by us. The three tags were placed some time early in the fall of 1926 and the birds were all killed during the late fall of 1927, about fourteen months afterwards. To me, this is one of the most important facts obtained from our tagging system. To think these three kept together during the winter of 1926, then in the spring of 1927 migrated north to Hudson Bay to nest, and then still kept together and the three were killed by one man at Commerce,

[5]In the possession of Mr. Fleming.

Missouri, late in the fall of 1927.—MANLY F. MINER.

A FLICKER MURDERER.—This is a true story which took place on the Grounds of Picton Collegiate Institute in the summer of 1926. It was told to me by an aunt who does not wish her name mentioned.

Every summer Flickers spend much of their time on the grounds of the school eating ants. They were never seen to quarrel before. One day my aunt and her sister were sitting on their verandah next to the Collegiate when they noticed one Flicker quarreling with another. With another look they saw that one Flicker was deliberately jumping on and pecking the top of the head of the smaller Flicker. The victim would try to get away by running under nearby bushes. All the time blood was oozing from the wound. It seemed too weak to fly, at least it didn't. Hiding was of no avail as the larger and stronger bird of the two kept following it up and pecking at the same spot on the poor bird's head. This went on for a time until my aunt, out of pity, went to the rescue, shooed the murderer away, and caught the poor bleeding bird, which by this time was almost dead. It died before it could be brought into her house.

On close examination no other wound was found and the bird seemed in perfect health externally.

"The last vicious sword thrust before I caught it must have finished the murder," my aunt said.

This is surely a blot on the clean page of the American Flicker.—J. ROLAND BROWN.

SUBSTANTIATION OF THE WINTER RECORD OF THE FLORIDA GALLINULE, TORONTO.*—On December 23, 1928, the Brodie Club held its annual Christmas bird census for the Toronto region, the writer being attached to the party which had Ashbridge's bay on its itinerary. Ashbridge's bay is no longer a paradise for birds. The sand- and mud-bars, the quiet ponds and fascinating rush-beds have been buried with waste and levelled with earth as a result of the growing demands of a great city. In spite of this defacement the area still proves productive of bird records unique for the region.

Shortly after 8 a.m., Prof. T. F. McIlwraith, Jr., and the writer flushed a dark gray, rail-like bird from a shallow stretch of open water at the border of the only remaining marsh, at the foot of Leslie street. The bird dropped into the dense, dry rushes giving us a fleeting glimpse of what appeared to be a gallinule or coot. Our plans for the morning brought us back to the spot some two hours later and again the above observers and Mr. H. H. Brown got a brief view of three of these birds. Due to circumstances positive identification could not be made.

On December 25, Mr. Brown and the writer made a hasty visit to this section of the marsh to ascertain whether or not the birds were still there. At this time four birds were seen and a resolution was formed to commit a breach of city regulations regarding shooting in this area.

On December 31, Mr. Stuart Thompson and the writer, equipped with a gun and waders, visited the spot again. After disappointing initial attempts the writer secured a chance shot at a movement in the rushes and Mr. Thompson retrieved the first winter specimen of the Florida Gallinule, *Gallinula chloropus cachinnans*, in Ontario.

Bent, in his *Life Histories of North American Marsh Birds*, (U.S. Nat'l. Mus. Bul. 135, p. 534), states that "the species has a few curious northern winter records as, Pennsylvania (Richmond, February 12, 1913); Massachusetts (Ware, about December 15, 1909, and Palmer); and Minnesota (Minneapolis, January 23, 1915).

This new Toronto specimen is an immature female with a frontal shield undeveloped and the throat and chin white somewhat marked with blackish. The latest specimen previously secured in this region is another immature female picked up dead in a fresh condition at Humber bay on October 28, 1928. (R.O.M.Z. No. 28.11.2.1.).

The birds observed at Ashbridge's bay were certainly not cripples, although the one collected had suffered frostbite on one toe. The shallow water in which these birds were feeding is disturbed by a slight current which emerges from an eight or ten foot bank of cinders and refuse. It had kept the margin of the small marsh free of ice up to December 31 and may do so during the remainder of the winter which so far has been a mild one. In such an event the remaining birds may safely spend the entire winter at Toronto.—L. L. SNYDER, *Royal Ontario Museum of Zoology, Toronto.*

*Brodie Bird Club Census at Toronto, 1928. *Canadian Field-Naturalist 43:36.*

THE SOARING FLIGHT OF BIRDS.—The Quarterly Journal of the Royal Meterological Society for January, 1927, under the above heading quotes a remarkable paragraph from a recent number of Mitteilungen des Aeronautischen Observatoriums Lindenberg. Director, Dr. H. Hergesell, The Aerological Observatory, Lindenberg, Germany. It gives an account of an interesting observation of the soaring flight of a Stork made during a

kite-balloon ascent on 2nd May, 1926. The bird was kept under constant observation through a range-finder for no less than 45 minutes, during which time not the slightest motion of the wings could be detected. The readings of the range-finder show that during an interval of twenty minutes the height only varied between 502 metres and 518 metres, the distance from the point of observation increasing from 1,625 metres to 2,000 metres.

The article goes on to point out that the kite ascent furnishes particulars of the conditions in the free atmosphere. In the lowest 120 metres the wind velocity increased from 9 metres per second at the surface to 15 metres per second. Above this surface layer there was an inversion about 300 metres thick, in which the temperature increased by 1.8° C. and the wind velocity increased further to 22 metres per second. Above that level the velocity fell off rapidly, and at 1,750 metres it had the comparatively low value of 4 metres per second. Instinctively the bird had selected the most favourable level for its flight, in this case the level of maximum wind velocity at the top of the inversion. Turbulence at the surface of separation suggests itself as the source of support.

The incident furnishes a beautiful example of perfect harmony between a living thing and its natural environment.—Extract from *Bird Notes and News*, published by the Royal Society for the Protection of Birds, Summer Number, 1927, Page 131.

HOLBOELL'S GREBE NEAR KINGSTON, ONTARIO, IN MIDWINTER.—The Royal Ontario Museum of Zoology has recently received a specimen of Holbœll's Grebe from Mr. Wallace Havelock Robb, of Kingston, Ontario. Mr. Robb states that the bird was apparently in a starving condition when it was picked up from the marsh in front of Abbey Dawn Sanctuary.

There appear to be no records for this species between the last week in November and the first week in March from the Toronto region so that this specimen from Kingston, taken on January 16 (1929), seems worthy of record.—L. L. SNYDER, *Royal Ontario Muesum of Zoology, Toronto.*

DEATHS AMONG COOTS AT SUMMERLAND, B.C. —The two weeks of extremely cold weather this winter caused the Okanagan Lake to freeze almost entirely over for the first time since 1916. Food has been very scarce for the water-fowl, especially the Coots; a great number have died. Several became frozen in the ice and perished before they could be rescued. Others have barely managed to exist by feeding at the mouths of the creeks where the water remained open. Two Bald Eagles have been flying over the feeding grounds for several days, and I suspect they are taking the Coots which are too weak to escape them.

However, the ice has at last broken in this section of the lake, so there will not likely be many more fatalities among the birds.—HERBERT M. SIMPSON.

THE GRASSHOPPER SPARROW AT TORONTO, ONTARIO.—The erratic occurrence of the Grasshopper Sparrow at Toronto has been recorded in *The Canadain Field-Naturalist*.[1] The year 1928 produced an early Toronto arrival date,[2] and the following notes, which, so far as I can learn, are the only summer records for that year, would seem to indicate that the birds were present and breeding.

On June 28 I heard and saw a singing male in an extensive field on the north-eastern border of the city. No traces of nesting were found, however, nor could the bird be located on subsequent trips, but, since there are several hundred acres of suitable habitat here, this is, perhaps, not surprising.

On July 2 during an enforced stop of two hours with motor trouble on a highway some fifteen miles north-east of Toronto (near Agincourt), a Grasshopper Sparrow sang the whole time from the top of a nearby telephone pole. This suggests that their breeding range extends, at least for a little distance, north and east from this city. —R. J. RUTTER.

EARLY NORTHERN MIGRATION OF ROBINS.— The exceptionally early arrival of Robins (*Planesticus migratorius migratorius*) at Port Arthur, Ontario, is worthy of note. A report in the local newspaper of February 7th, 1929, that they had been seen by local residents was read with some skepticism, owing to the Pine Grosbeak (*Pinicola enucleator leucura*), a frequent winter visitor being sometimes mistaken for the Robin. On Monday, February 11th, however, I located a flock of approximately thirty birds and was able to satisfy myself of the correctness of the identification. While the occasional early bird is seen in some years, it is most exceptional to see them in such numbers so early in the season, and difficult to account for. The weather prior to their arrival was not exceptionally mild, the nightly temperature averaging around zero, and since

[1]Thompson, S. L., Occurrence of the Grasshopper Sparrow at Toronto, Ont., *The Canadian Field-Naturalist*, Vol. XLI, No. 4, pp. 88, 89.

[2]Snyder, L. L., An Early Date for the Grasshopper Sparrow at Toronto, Ont., *The Canadian Field-Naturalist*, Vol. XLII, No. 7, p. 179.

that time we have had the coldest spell experienced this winter, for several nights the thermometer registering from 14 to 24 degrees below zero. Fortunately, there is a plentiful supply of the berry of the Mountain Ash, on which these birds are feeding and in spite of the extreme cold, there seems to be no dimunition in their numbers.—L. S. DEAR, Port Arthur, Ont.

STARLINGS AT A FEEDING STATION.—Until this winter, I had always found that a lump of suet suspended to swing freely at the end of twelve or eighteen inches of string provided food for Woodpeckers, Nuthatches and Chickadees that could not be usurped by any other species. Occasionally a House Sparrow (*Passer domesticus*) will alight on such a device, but will immediately fly off again, alarmed or distressed by the motion. This winter, Starlings (*Sturnus vulgaris*) have shown that they can feed from a swinging lump of suet as readily as a Woodpecker. I have frequently seen two of these birds feeding together from a widely-swinging suet-container; and I have seen three or more taking turns at doing so, showing that it is not merely an individual accomplishment. A male Downy Woodpecker made no attempt to feed until the Starlings left. Up to the present, the Starlings have not succeeded in feeding from the inverted food board designed and described by Mr. W. E. Saunders.—R. OWEN MERRIMAN, Kingston, Ont.

TOWHEE AT TORONTO IN FEBRUARY.—On the morning of Thursday, February 14, 1929, I was surprised and interested to see a male Towhee (*Pipilo erythrophthalmus erythrophthalmus*) visit the feeding station in the garden of Mr. and Mrs. H. G. Henson, Donwoods Drive, just north of the Toronto city limits near Yonge Street. Mrs. Henson, who did not know the bird, tells me that it had fed there almost every morning for about three weeks before I saw it, and that it was sometimes accompanied by another which, from her description, is evidently a female Towhee. Only the male bird appeared while I was there.

Natural History of the Toronto Region (1913) "Birds, By James H. Fleming," lists the Towhee as "Summer resident; breeds; common migrant." The above February observation seems, therefore, worth placing on record.—IDA MERRIMAN, Kingston, Ontario.

STATUS OF SEA BIRDS ON BARE ISLAND, BRITISH COLUMBIA, 1927.—When the sea-bird colony at Bare Island in Haro Strait was visited on July 21st, 1927, it was found that some changes, considered worth recording, had taken place in the status of nesting water fowl. The species concerned are as follows:

Lunda cirrhata. TUFTED PUFFIN.—This species had increased from the five or six pairs, usual in recent years, to an estimated fifteen pairs.

Cepphus columba. PIGEON GUILLEMOT.—The colony was found to be considerably smaller, an estimated forty pairs as against one hundred and fifty pairs in 1923. Search of the nesting ground revealed the fact that many birds had died perhaps three weeks or a month earlier. The dried carcasses were found both in the open and in nesting crevices. In the latter cases it was seen that the birds had died after laying eggs. In every case the bodies were too much decayed to admit of dissection and I have no theory regarding the cause of this mortality.

Larus glaucescens. GLAUCOUS-WINGED GULL.—The Glaucous-winged Gull population was estimated at 1000 pairs, an approximate increase of four hundred pairs since 1923. Some 100 nests containing eggs were examined, but the great majority contained young newly hatched or a few days old. The youngest birds remained in the nest when two observers walked across the island; the older ones hid in crevices, under bushes or whatever cover was nearest to hand. Several dead downys with wounds on the head were noticed, no doubt killed by adult birds. In my experience this is a rare habit with Glaucous-winged Gulls. All of the young of suitable size were banded by Mr. F. R. Butler of Victoria, assisted by the writer. Some of the nesting birds resented human intrusion on the island and swooped repeatedly barely clearing the heads of the observers, in fact one of the party actually was struck. In a short time the birds quieted down and no difficulty was found in taking photographs at close range.—J. A. MUNRO.

WHAT SURGEON TO THE BIRDS TREATED THIS PINE GROSBEAK?—An endeavour is being made by Mr. J. Deane Cochran, a bird bander, residing at Barkerville, British Columbia, to ascertain the name and address of the person who set the broken legs of a Pine Grosbeak which visited his banding station during the summer of 1928. The bird was a male and remained about a month at the station. Mr. Cochran reports that its two legs had once been broken and had been set in a skilful manner. One leg, which had been broken above the "knee", had lost its bindings before the bone had healed and was deformed, but the other still carried its bindings. The bird was very tame, feeding without fear at Mr. Cochran's feet. It wore no band.—HOYES LLOYD.

SWALLOWS' NESTS.—During the past two summers I have had some rather interesting experiences with swallows, that are, perhaps, of sufficient interest to pass along to the readers of *The Canadian Field-Naturalist.*

During the season of 1926 a pair of Barn Swallows nested in the barn cellar on the adjoining farm. The nest was a very shallow affair and was built on a knot protruding from a large beam, the top of the nest being about 1½ inches from the floor of the stable, above.

During the early summer of 1927 the nest was again occupied for a short time, and one egg was laid. On visiting the nest the next day I found that it had become loosened but had not fallen down, so I put it back in place and drove two nails under it to hold it there.

The birds decided to desert the nest, however, and promptly started to build on a three-inch shelf that I had put up under the eaves of our new barn, about 100 yards distant.

The foundation of the nest was about 15 inches in length and as they proceeded they made two separate nests of it on the eastern two-thirds of the foundation. The nest was started on Sunday morning and finished the following Saturday, both birds taking part in the work.

Owing to the nature of the nest a larger amount of material was necessary than usual, all of this being carried from the barn cellar where their old nest was located. No mud was used, the nest being made entirely of manure, interwoven with straw and horsehair.

Three eggs were laid, after a lapse of eight days from the time the first egg was laid in the old nest. After the young birds were a few days old they were divided up between the two nests and after leaving the nest they returned to it to spend the night for nearly a week.

Nine days after the young birds left the nest we had a heavy rainstorm and again they returned for the night, after being absent for three nights.

This last summer (1928) the swallows did not return to their new nest under the eaves and I did not think of them returning to the old nest in the barn cellar but on looking there I found four young birds in the nest which I banded a day or two later.

About this time three pairs of Cliff Swallows came along and looked the nest over that the Barn Swallows had built the year before. I might add that this is the only Barn Swallows' nest that I have ever seen under the eaves of a building. They seemed to like the location and promptly started to build the walls of these two nests up to meet the eaves of the building, about four inches above the top of the nests as the Barn Swallows used it. The third pair built on the foundation that extended out several inches from the west part of the nest.

Another pair of Cliff Swallows nested on a one-inch shelf under the eaves of the same building, which is a more suitable width for this species. The whole affair was rather interesting and perhaps worth passing on to others.—JOHN W. PIGGOTT.

Microsorex hoyi, A NEW MAMMAL FOR THE TORONTO REGION.—On April 20, 1929, while searching for mice at Cedarvale, Toronto, a small shrew darted under a piece of tin which lay on the ground before me. Lifting the tin I captured the specimen alive but having no equipment to keep the beast as a captive I humanely dispatched it and prepared the skin as a study specimen.

The specimen has been identified at the Royal Ontario Museum of Zoology as *Microsorex hoyi hoyi*. This record appears to be the first for the species in the Toronto region. The measurements as taken from the shrew in the flesh are as follows: Length, 87 mm.; Tail, 31 mm.; Hind foot, 10½ mm. The specimen, a male, is now in my collection.—C. E. HOPE, 501 Arlington Ave., Toronto.

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During the last ten years Jack Miner has written many articles which have been published from coast to coast in all leading Canadian and United States newspapers, the result being that each article or statement has had a tremendous circulation, and been received so well by the public that, during the last few years, from fifty to one hundred letters would find their way daily to Jack Miner's post office box asking for reprints of these articles. So rapidly did these requests pile up, that upon taking the matter up with Ryerson Press, Toronto, they decided to place on the market all these articles in book form, calling the book "Jack Miner on Current Topics." It contains over fifty photographs taken on the bird sanctuary to illustrate the various articles. It retails at $2.50, and can be purchased at any book store, or direct from Ryerson Press, Toronto, Ontario. Should a profit be derived from the book the money is to be used to maintain the Jack Miner bird sanctuary.

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CONTENTS

	PAGE
William Couper—A Pioneer Canadian Naturalist. By James L. Baillie, Jr.	169
Memoirs of the Eighties. By Norman Criddle	176
Glimpses of Little-Known Western Lakes and Their Bird Life (*Continued*). By J. A. Munro	181
Echinoderms from the Gulf of St. Lawrence. By Frits Johansen	187
The Cardinal at Toronto, Ontario. By R. J. Rutter	188
Notes and Observations:—	
The Distribution of the Basswood at Parry Sound, Ontario. By H. W. Fairbairn	188
Re-Mating of Red-breasted Sapsuckers. By Thomas T. McCabe and Elinor Bolles McCabe	189
Who Banded This Gull? By Hoyes Lloyd	189
Chickadees Caught by Tanglefoot. By R. W. Tufts	189
Starlings in Fredericton, N.B. By Susan K. Squires	189
Evening Grosbeak (*Quoted from the Diary of Mrs. Anna E. MacLoghlin, Hamilton*). By W. E. Saunders	190
Book Reviews:—	
A Manual of External Parasites. By N. C.	190
The Change in Ideas about Foraminifera. By E. M. Kindle	190
Coregonid Fishes of the Great Lakes. By Andrew Halkett	191
Official Canadian Record of Bird-Banding Returns	192

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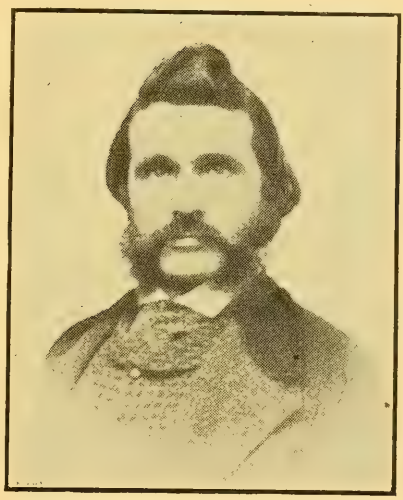
WILLIAM COUPER—A PIONEER CANADIAN NATURALIST

By JAMES L. BAILLIE, JR.

MR. Ernest Thompson-Seton has recently called the attention of present-day naturalists to the life and work of this pioneer Canadian entomologist and asks readers of *The Canadian Field-Naturalist* to supply missing details concerning William Couper and his connections.[1] Becoming interested and hoping to supply further information to Mr. Seton's note, the writer undertook to search the literature for references concerning, or articles by, Couper. To these data have been added facts secured from various other sources, and, no previous attempt having been made to bring this scattered information together, it is hoped that sufficient material has been gathered to warrant publication.



It has been deemed convenient to separate this information into the five well-defined periods of Couper's life, which have been arranged in their chronological sequence. So far as the writer is aware the date and place of his birth and death have not been published. I have not been successful in locating any of his relatives and it will be noticed that comparatively little seems to be known of his personality or family-life although considerable data have been accumulated on his work and his connections.

In the course of this undertaking I have been fortunate in meeting one man who knew Couper in the early period of his life, the Rev. Prof. C. J. S. Bethune. I have had a very pleasant interview with Dr. Bethune (now 91 years of age and residing in Toronto) and have read the manuscript to him, the contents of which he has corroborated. Dr. Bethune has given me certain additional facts about Couper, for which I wish to express my grateful acknowledgment. I wish to thank Dr. E. M. Walker, Assistant Director, and Mr. J. H. Fleming, Honorary Curator of Ornithology, of the Royal Ontario Museum of Zoology, for advice and valuable assistance extended during the preparation of this little biographical sketch. I am also very much indebted to McGill University, Montreal, through Mr. Albert F. Winn of the Lyman Library of Entomology and Mr. V. K. Symonds of the Emma Shearer Wood Library of Ornithology, for references and much information included in this sketch. The bulk of the material and facts herein set forth, however, has been gleaned from various publications, some of them not now generally accessible, the most important of which are *The Canadian Journal and Proceedings of the Canadian Institute* (1852-1890), *The Canadian Naturalist and Geologist* (1856-1883), *The Canadian Entomologist* (1868-1928) and *The Annual Reports of the Entomological Society of Ontario* (1870-1894), Cassino's *Naturalists' Directories* (1877-1892) and *The Canadian Sportsman and Naturalist* (1881-1883). Besides these, a number of other publications issued during Couper's lifetime have been thoroughly consulted for information about him.

TORONTO (1842-1859).

Although nothing definite has been learned about Couper's birth-place, he states[2] that he

[1] *Can. Field-Nat.*, Vol. 42, 1928, p. 208.

[2] *Can. Sports. and Nat.*, Vol. I, 1881, p. 86.

came to Canada in 1842 and Dr. Bethune assures me that he came from England. Couper further tells us[3] that he began to make observations on natural history at Toronto in 1843 so we can safely assume that he first took up residence there. Dr. Bethune, in 1862, wrote[4] that Couper "—Entered the Entomological field of Canada in 1843 and continues his researches. Collects all the orders and studies the distribution of Coleoptera". Couper himself states[5] that his residence at Toronto covered a period of seventeen years, which sets the date of his arrival there at 1842.

Some conception of his early interest and connections in entomology is gained by reference to *The Handbook of Toronto*, 1858, and an unsigned passage on page 64 (given below) makes it evident that Prof. Henry H. Croft of University College (later one of the founders and first president of the Entomological Society of Ontario) was at least partially responsible for the tuition that Couper received during the period of his Toronto residence. The passage is as follows,—"Entomology is a branch of Natural History but little studied at Toronto. Some nine years ago [1849] Professor Croft delivered a very interesting lecture on Entomology in the Mechanics' Institute, and contrary to the expectations of some of the Committee of the Institute who looked upon the subject as rather a small affair, and not likely to be attractive, he had a large audience. The worthy Professor exhibited a collection which he had himself formed, and which up to that time had been strictly private, and although the subject was entirely new to most of the audience, they were exceedingly delighted with such a large collection of "beautiful butterflies". The lecture had one happy result, for it gave a stimulus to Mr. William Couper, then a journeyman printer in the *Globe* office, to prosecute with greater vigor a study which he had a few years before commenced, and which from that time to this [1858] he has prosecuted with unabated zeal and with very great success. When Dr. Goadby delivered his admirable lectures on Natural History in Toronto, in 1854, he paid a high and justly merited compliment to Mr. Couper as a "most successful entomologist". It might be mentioned that Prof. Croft arrived in Toronto in 1843, at the age of twenty-one, having been appointed to the Chair of Chemistry at the University.

Couper tells us[6] of collecting a bat north of Toronto in the summer of 1851, which he sent to Professor Louis Agassiz for determination and we learn that Prof. Agassiz was greatly interested in the record as that particular species of bat had not previously been taken so far north. Even to-day much has yet to be learned of the distribution of many of our small mammals and it can easily be imagined that collected specimens must have been in great demand eighty years ago. It is obvious that Couper took an early interest in mammals but his chief interest, however, was entomology, and this was manifested immediately upon his arrival in Canada as he reminds us[7] that, in 1843, when he "was a youth, studying insects, books containing descriptions and life-histories of species inhabiting Canada could not be obtained for love or money—there were few systematists in the United States—and the papers then published were obscure to the beginner."

In the autumn of 1852 he exhibited a collection of insects and insect-architecture at the Provincial Fair held at Toronto, which exhibit was something new to fair-goers there at that early period. For this display Couper was highly commended by Captain (later Sir) J. H. Lefroy[8] in his presidential address before the Canadian Institute. In 1853 Couper published[9] three Naturalists' Calendars for the Toronto region, covering the months of April to December of that year. In these were recorded the first appearances of the more conspicuous butterflies, moths and birds, occasional notes on mammals, reptiles and batrachians and dates of the first ripening of wild fruits, etc. To the ornithologist, at least, it is unfortunate that these calendars were not continued as they contained valuable information—passenger pigeons in flocks on August 5, occurrence of the snowy owl on November 4, notes on the nesting dates of certain birds, etc.—and our knowledge of the ornithology of the Toronto region in the early "fifties" is indeed scant enough.

For Couper's addresses in Toronto the writer has consulted seven of the early city directories and in the directory for 1850[10] the name Couper appeared for the first time, reading "William Couper, printer, Duchess St." Dr. Bethune tells me that Couper did not carry on a printing business of his own but was employed in H. Rowsell's bookstore and printing establishment, and it has already been mentioned that in 1849 he was a journeyman printer in the *Globe* office. Couper was elected to membership in the Canadian Institute (established in 1849) on March 17, 1855, and his address given as "Queen Street" and in *Brown's Toronto General Directory, 1856*,

[3] *Can. Journal*, Vol. 2, 1853-54, p. 19.
[4] *Can. Nat. and Geol.*, Vol. 7, 1862, p. 200.
[5] *Can. Nat. and Geol.*, Vol. 7, 1862, p. 278.
[6] *Can. Journal*, Vol. 2, 1853-54, p. 171.
[7] *Can. Sports. and Nat.*, Vol. 3, 1883, p. 220.
[8] *Can. Journal*, Vol. 1, 1852-53, p. 122.
[9] *Can. Journal*, Vol. 2, 1853-54, pp. 20, 76, 124.
[10] *City of Toronto & County of York Directory, 1850-1*, by H. Rowsell.

his place of residence was more fully given as on the south side of Queen between Ontario and Berkeley streets. In June, 1859, he had forsaken his trade and appeared[11] as naturalist, entomologist and dealer in artificial eyes, his place of business being at 358 Yonge street. He carried on business at this address, however, only for the short period of a month or two, during the spring of 1859. In each of the directories which contained his name he was the only Couper listed as living in the city.

Couper was one of the first to carry on entomological work at Toronto. The aspect of the district at that time must have been very different from that of the same ground to-day. In 1842 (when he arrived in Toronto) the area of the city was 1 1-3 square miles[12] and the population 15,336, whereas to-day the city has a population of 569,899[13] and the area comprised within its limits is 35 square miles.

The venerable Prof. Bethune, himself one of Canada's pioneer and best known entomologists, tells me that he knew Couper well when he was living in Toronto in the "fifties", and that he often used to visit his place, when the topic was always entomology or allied subjects. Dr. Bethune remembers Couper saying very little about himself during their acquaintanceship but remembers him most particularly as a capable naturalist, of all-round ability, and as the author of "splendid articles" in the early zoological journals. Couper was not tall in stature. The predominant feature about him was his zealous pursuit of the study of natural history.

Of interest to all entomologists and more directly to those in Canada, is a splendid history of entomology in Canada from the time of the early settlers to 1898, written by Rev. Dr. Bethune and entitled *The Rise and Progress of Entomology in Canada*.[14] A perusal of this paper convinces one that Couper was an important factor in the spreading of knowledge of our Canadian insect fauna in those pioneer days of the middle part of the last century. Dr. Bethune, in his presidential address delivered before the 50th annual meeting of the Entomological Society of Ontario in 1913, put on record an acknowledgment of his personal indebtedness to Couper by stating that when he was a student at Trinity College, in the "fifties", he first began the collection and study of insects and about the first assistance and encouragement that he received was from the "excellent short descriptions of the more conspicuous beetles found in the neighbourhood of Toronto, written by Wm. Couper, a printer by trade." The notices referred to appeared in the *Can. Journal*, 1854-56. They contained a list of the species he had found (arranged according to Melsheimer's catalogue),[15] descriptions of each, local abundance, habitat, measurements and short concise notes on habits. After the appearance of the first of these articles, Prof. Henry Croft said[16], "—Mr. Couper having commenced a catalogue of his insects, it is greatly to be hoped that he may continue it, as few persons in Toronto are better qualified for the task, on account of his already tolerably extensive cabinet and his zeal in collecting."

In the same volume of the *Can. Journal* (1854-55) Couper had an article on *Vermes* in Grasshoppers and during his Toronto residence he also contributed articles on insects to the *Can. Nat. and Geologist*, Vols. 2 & 3 (1857-58).

The museum of the Can. Institute was the recipient of occasional specimens from him but it was the University of McGill College which, in 1857, acquired his collection of Toronto insects, numbering in the neighbourhood of 2400 specimens, including over 700 species of beetles.

As early as 1855 he was a corresponding member of the Natural History Society of Montreal and in 1856, of the Literary and Historical Society of Quebec. On February 1, 1859, the Toronto Microscopical Society was formed to "undertake microscopical research" and Couper attended the inaugural meeting and was elected corresponding secretary and Curator[17]. Shortly after June of that year he left Toronto.

QUEBEC (1859-1868).

In the latter part of 1859 William Couper was living in Quebec city. The *Can. Nat. and Geol.*, Vol. 6, June, 1861, contains a critical note by him on the entomological nomenclature used by Gosse[18]. In the Quebec city directory issued in July, 1861,[19] his address was given as 47 St. John street, Upper town, and his business that of naturalist, zoological artist and entomologist.

I am indebted to Mr. Winn for the reference to the following passage concerning Couper, written by Canon V.-A. Huard of Quebec in 1917[20],—"In the Province of Quebec—the first name to be recalled in the history of Entomology is that of William Couper, who lived in several of our larger towns towards the middle of last

[11] *Toronto City Directory for 1859-60*, by W. C. F. Caverhill.
[12] Supplied by Mr. Tracy D. Le May, City Surveyor.
[13] *Canadian Almanac*, 1929.
[14] *Proc. and Trans. of the Royal Soc. of Can.*, Series 2, Vol. 4, 1898, pp. 155-165.
[15] Published by the Smithsonian Institution.
[16] *Can. Journal*, Vol. 3, 1854-55, p. 213.
[17] *Can. Nat. and Geol.*, Vol. 4, 1859, p. 155.
[18] *The Canadian Naturalist*, by P. H. Gosse, 1840.
[19] *The Quebec Directory for 1861-62*, by G. H. Cherrier. July, 1861.
[20] *9th Ann. Rep. Que. Soc. for the Prot. of Plants*, 1917, p. 54.

century. He appears to have been the first man in Quebec to make a collection of insects, and his name is connected with the discovery of several new species of Lepidoptera and Coleoptera. He was probably the first to make a study of the insects of Labrador and the Island of Anticosti—".

During his residence at Quebec he contributed many articles on insects to the *Can. Nat. and Geol.* and papers to the Lit. and Hist. Soc. of Quebec, of which he was a member and, in 1865, assistant secretary. Couper was elected a corresponding member of the American Entomological Society at Philadelphia (founded in 1859) on November 10, 1862. To this Society I am very much indebted for the loan of the photograph of Couper which accompanies this sketch. It bears the name of the photographer, J. A. Quinn, 10 John Street, Quebec, and although I am informed by Mr. James A. G. Rehn, corresponding secretary of the Society, that they have no record as to the approximate date on which the photograph was taken, it is certain that it was taken during Couper's residence at Quebec, and probably about 1862.

In 1864 he was appointed to the committee on insect-architecture and in 1865 to the committee on Coleoptera and Diptera of the Entomological Society of Canada (founded in 1863 and later known as Ent. Soc. of Ontario). In 1864-65 he published his *List of Coleoptera taken at Quebec and other parts of Lower Canada* in the Trans. of the Lit. and His. Soc., describing at least thirteen species new to science. In 1865 he was Curator of the Quebec branch of the Entomological Society, a branch in the formation of which he was, in all probability, at least instrumental.

During these years l'Abbé L. Provancher, later one of Canada's most prominent entomologists, was Couper's protégé[21], and although a statement was made by Couper to that effect in 1882, it seems to be a rather disputable fact, although the two entomologists undoubtedly corresponded with each other to some extent. That Couper was ever ready to assist younger naturalists, however, is evident from the following statement by Dr. F. W. Goding,[22] in an article entitled *In Memoriam: George John Bowles*,—"—In 1863 Mr. Bowles began to direct his attention more particularly to entomology. At that time, Mr. Wm. Couper, a well known Canadian naturalist, lived in Quebec, and to him Mr. Bowles came for assistance, which was cheerfully given him at all times—". Mr. Bowles, it will be recalled, was later a most able entomologist.

In the summer of 1867 Couper made his first trip along the north shore of the Gulf of St. Lawrence (Canadian Labrador), the object of the trip being "to collect a series of birds' eggs and to determine the species breeding on the coast." Starting from the bay of Seven Islands he proceeded eastward as far as the Musquarro Islands and Washikuti Bay. The results of this venture appeared in an article entitled *Bird-nesting in Labrador*[23], in which he records finding 29 species, including 19 breeding.

In 1907 Dr. Chas. W. Townsend and Dr. Glover M. Allen published[24] a joint paper entitled *Birds of Labrador* in which was summarized all previous work in that field known to its authors. No mention is made of Couper in their account of previous workers and his *Bird-nesting in Labrador* is attributed in their bibliography to N. A. Comeau, in error.

Couper's list, being published in the *Can. Sportsman and Naturalist*, is probably accessible to few, so it seems advisable to make a few remarks on certain species listed by him. *King Eider:* Couper says, "—It is only on the islands below Point Esquimaux, which are not so easily accessible to man that the nests of these birds (*Somateria mollissima*) are found. The oölogist who can visit the group of islands between the latter place and Watsheesho, about the middle of May, will find—abundance of Eider Duck's nests. Indeed, one small island visited by us, was almost covered with the nests of this species, and here we first found the nests of its congener the King Eider, (*S. spectabilis*)". Stearns[25] cites this record (erroneously attributing it to Comeau) and adds "This is, I believe, the first record of this rare nest found on the Atlantic"; and Townsend and Allen comment on Stearns' citation considering the record "an exceptional and rather doubtful southern instance." *Red-tailed Hawk:* Couper says of this species in 1867 "Sir Greville Smyth, who was fishing the Mingan, found a nest of the Red-tailed Hawk, (*Buteo borealis*). It contained two young ones, which could feed themselves at the end of July". This hawk is considered a very rare summer visitor to Labrador and is not supposed to breed. *Blackburnian Warbler:* Couper's statement regarding this species is as follows, "—The Blackburnian Warbler was common in June in the woods of Natashquan, but no nest was found; it is possible that they pass on to the northern margin of the forest which adjoins the plains to breed". Townsend and Allen say "The only record of this bird of the sub-Canadian and Transition zone for Labrador is that of Audubon—". *Redstart:* Couper says

[21] *Can. Sports. and Nat.*, Vol. 2, 1882, p. 155.
[22] *20th Ann. Rep. Ent. Soc. of Ont.*, 1889, p. 20.
[23] *Can. Sports. and Nat.*, Vol. 1, 1881, pp. 50-52; (see also Vol. 3, 1883, p. 275).
[24] *Proc. Bost. Soc. Nat. Hist.*, Vol. 33, 1906-07, pp. 277-428.
[25] *Proc. U.S. Nat. Mus.*, Vol. 6, 1883, p. 121.

the Redstart was found in abundance by him, but it is only within recent years that the bird has been considered common there, and previous to 1909 the records were "very scanty".

The "series of birds' eggs" stated by Couper to have been one of the objects of his trip, is probably not now in existence. If it was the question of the authenticity of his King Eider record could probably be settled. The record of course, cannot be accepted as authentic now; even the eggs are not always easily identified, apparently, as Anderson,[26] quoting Hantzsch, says "whether, however, eggs collected really belongs to this species, must be proven in every single case". The Red-tailed Hawk, Blackburnian Warbler and Redstart observations are possibly correct but are, at best, only sight records.

After his 1867 trip, Couper wrote in the *Quebec Chronicle* deploring the destructive practice of the Indians near Mingan of spearing salmon in their spawning grounds. In 1868 he is supposed to have visited Mingan again but as I have only seen two statements[27] (made by Couper several years later) regarding a trip made during that year, I am inclined to think that *1868* was, in each case, a printer's error for 1867.

The now abundant and continentally distributed European cabbage butterfly (*Pieris rapæ*) was first found in America at Quebec, in 1859, when Couper collected a single specimen[28]. Additional specimens of the butterfly were secured there in 1863 by Couper and Bowles, by which summer it had become exceedingly abundant[29]. Dr. Bethune is of the opinion that the insect originated in America from cabbage thrown overboard from some ocean liner in the St. Lawrence river above Quebec.

Couper's residence in Quebec city evidently came to a close in 1868, some time after his trip to Labrador. He tells us that he lived nine years in Quebec[30].

OTTAWA (1868-1871).

Before October of 1868 Couper was living in Ottawa, where he remained until 1871. His residence there, in all probability, dated from the early part of 1868, as we have his word[31] that he spent three years there. Information is completely lacking on his address and connections in Ottawa.

From the capital he wrote several articles on insects for the *Can. Entomologist* (then in the first years of its existence) treating various branches of the study. He seems to have been one of the first of the earlier naturalists who took a serious interest in the study of spiders. He was Ottawa agent of the *Can. Entomologist* and in September, 1869, was elected to the council of the society.

This period of his life was a short one, but during it he continued to add to his store of knowledge and his diversified writings at this period testify to his having possessed a keen mind and uncommon powers of observation.

MONTREAL (1871-1884).

We next hear of him in 1871 living in Montreal although the literature contains facts which tell of him actively collecting there in May of 1870, while residing in Ottawa. In 1872-73 his address was 38 Bonaventure strreet, from 1874-79 No. 67 and in 1879 No. 83 of the same street. Mr. Winn informs me that Bonaventure was the old name for part of the present St. James street, lying west of Victoria square. From 1880-1884 he carried on business at 806 Craig street as naturalist and taxidermist. For certain facts concerning his Montreal addresses I must acknowledge my indebtedness to Mr. Ruthven Deane of Chicago.

The *Can. Entomologist*, Vols. 2 to 12 (1870-1880) contains frequent and varied contributions from his pen, dealing exclusively with insects.

During this period of his life he made three more trips to the north shore of the Gulf of St. Lawrence, in the summers of 1872, 1873 and 1878. He visited Anticosti island on the first two of these ventures and we learn[32] that the Buffalo Society of Natural Science received some of his 1873 (June and July) collection of Anticosti butterflies. In that summer he collected a new butterfly, which was named *Glaucopsyche couperi* in his honour, by Aug. R. Grote in 1874. At least one other insect bears his name, *Bombus couperi*, described by Cresson in 1878.

Couper was a professional collector who realized the need for entomological work in that northern region and it appears certain that he undertook these trips in the face of handicaps and evidently on his own resources. Through the medium of the *Can. Entomologist*, however, he solicited orders for specimens in advance of each of these collecting ventures and it is conceivable that they were at least partially financed in this way. The great demand for material from Labrador by entomological students all over America at that time resulted in his being unable to fill all the orders and as a consequence three trips were necessary. The *Can. Entomologist*, Vol. 4, 1872, pp. 201-206, contains an important article by

[26] *Can. Field-Nat.*, Vol. 42, 1928, p. 205.
[27] *Can. Sports. and Nat.*, Vol. 1, 1881, pp. 25 & 33.
[28] *Ann. Repts. Ent. Soc. of Ont.*, 1871, p. 82; 1875, p. 355.
[29] *Can. Nat. and Geol.*, N.S., Vol. 1, 1864, p. 258-262.
[30] *Forest and Stream*, Vol. 8, 1877, p. 299
[31] *Can. Sports. and Nat.*, Vol. 1, 1881, p. 83.
[32] *Bull. Buff. Soc. Nat. Sc.*, Vol. 1, 1874, p. 185.

him giving the results of lepidoptera collecting that summer (June 18-August 1) on Anticosti island and the north shore of the Gulf. We learn that a serious reverse occurred when practically his whole six-weeks' collection (excepting his Anticosti specimens) was destroyed by Indians near Mingan, who took revenge on him in this way for his exposure of their salmon-spearing activities. Undaunted, he returned the following summer to replace the collection, carefully avoiding the vicinity of Mingan.

Seton has given us the reference[33] to Couper's report on the mammals he found on the island of Anticosti and in the province of Quebec (*Notes on Mammals of Canada*), but nothing seems to have been published on the birds he observed during his two summers on the island, excepting when he makes some remarks on the Fox Sparrow at Ellis bay[34] and on the nesting of the Pigeon Hawk on the island[35]. In regard to the last named species, Couper simply states that it "nests—on the island of Anticosti."

The latest summary of the birds of Anticosti was made in 1924 by Lewis and although our knowledge of the ornithology of the island is, as the author states, still regrettably incomplete, the scattered information is brought together into a readily available form and Mr. Lewis' work represents the present state of our knowledge of Anticosti birds. Mr. Lewis lists the Pigeon Hawk[36] as a common bird of the island (on the authority of Schmitt, Dionne and Brooks) but does not record it as a breeding bird. Whether Couper's statement was based on his own observations or not is not stated but it seems altogether likely that it was.

Couper's last trip to the north shore of the Gulf, in 1878, took him only as far as the Godbout river, where the late Napoleon Comeau assisted him in securing specimens of insects[37]. Couper subsequently reported the results of this undertaking to the Montreal branch of the Ent. Society of Ontario in 1879, in a paper entitled *My Entomological trip to the Godbout River, 1878*. The results of this trip which was, evidently, entirely an entomological venture, have never appeared in print.

On August 30, 1873, Couper, with four other Montreal enthusiasts, organized the Montreal branch of the Ent. Society of Ontario and he was elected its first president, which office he held also in 1874, 1875 and 1879. He was vice-president in 1881, 1882 and 1883. The monthly meetings were, during the first winter (1873-74) held at his house. He was, from 1875-1883 annually on the council of the parent body but he attended very few of the annual meetings and it seems that he merely acted in the capacity of Montreal representative of the Society's organ, the *Can. Entomologist*.

Couper's insects were sold or exchanged to an infinite number of collectors but Mr. Winn informs me that, in addition to Couper's Toronto collection, the Peter Redpath Museum of McGill University received a number of his specimens through contemporary entomologists of his time and from the Nat. Hist. Soc. of Montreal. Though a careful observer and an indefatigable collector it is to be regretted that Couper was not always careful in correctly labelling and naming his specimens. It was not an easy matter to identify Canadian insects in Couper's time and he will be excused for incorrectly naming his material. Pioneers in any branch of natural history did not always prosecute the study in the manner that enlightened naturalists of to-day would advocate and their methods might, at times, have seemed crude, but we must not completely forget their efforts, or overlook the fact that conditions then were quite different from conditions to-day. We should benefit by their mistakes.

During the summers of 1879 and 1880 he was engaged collecting bees and wasps at Montreal and his published list[38] was the first Canadian list of these insects. Later he published a revised list[39] entitled *Canadian Hymenoptera*, in which were listed 51 species.

From 1877 to 1880 he contributed occasional original notes on birds, mammals and fish to *Forest and Stream* and to the *Ornithologist and Oölogist*. His records of birds have been frequently quoted by writers on Quebec ornithology as we find his name appearing as authority for certain records in Vennor's *Eagles, Hawks and Owls of Canada* (1879), Samuels' *Our Northern and Eastern Birds* (1883), Chamberlain's *Catalogue of Canadian Birds* (1887), Wintle's *Birds of Montreal* (1896) and Dionne's *Les Oiseaux de la Province de Quebec* (1906).

In September, 1879, he exhibited a collection of 45 "stuffed" fish (of 26 species) at the Dominion Exhibition at Ottawa, which collection was later purchased for the McGill University Museum by Dr. Sterry Hunt[40].

Couper was perhaps best known as editor of *The Canadian Sportsman and Naturalist*, which he probably founded (Seton). This rare little publication contained important information on Canadian zoology, including such works as J. A.

[33] *Forest and Stream*, Vol. 8, 1877, pp. 299-300.
[34] *Can. Sports. and Nat.*, Vol. 3, 1883, p. 238.
[35] *Can. Sports and Nat.*, Vol. 1, 1881, p. 51.
[36] *Can. Field-Nat.*, Vol. 38, 1924, p. 89.
[37] *Can. Entomologist*, Vol. 29, 1897, p. 256.
[38] *Can. Sports. and Nat.*, Vol. 1, 1881, p. 19.
[39] *Can. Sports. and Nat.*, Vol. 3, 1883, p. 245.
[40] *Forest and Stream & Rod and Gun*, Vol. 15, 1880, p. 247

Morden and W. E. Saunders' *Lists of the Birds of Western Ontario* and Dr. J. H. Garnier's *List of Reptilia of Ontario*. The periodical was issued monthly at Montreal for the years 1881, 1882 and 1883, 36 numbers in all. As editor, Couper contributed much towards its success, and its pages are replete with his own writings, describing the Labrador country which he had visited and commenting accurately on various natural history subjects. His all-round knowledge is best shown in this magazine, where he wrote on such diverse subjects as entomology, mammalogy, ornithology natural history in schools, Canadian museums, lobster fisheries, fish culture, game conservation, etc. His articles on Canadian museums consisted of a series of short accounts giving a brief history of the seven institutions then in existence in eastern Canada and an account of their collections. His list of Quebec coleoptera contained 1012 species occurring in the province.

Dr. James Fletcher, in 1883 president of the Ottawa Field-Naturalists' Club, said of the publication,[41] "—it is ably edited by Mr. W. Couper, who is well known as an energetic hard-working student of nature and well worthy of support by all naturalists".

For a time W. W. Dunlop and E. D. Wintle were associated with him in the editing of the magazine but their names appear on only one of the 36 numbers. Although it showed every indication of becoming a permanent addition to our Canadian zoological literature, the useful little publication ceased to be issued when Couper's fourteen years' residence in Montreal came to a close. The last number (Dec. 1883), issued in February, 1884, contains an editorial stating that the periodical would terminate with that number owing to increased demands on the editor's time from his business. Dr. J. A. Allen, editor of the *Auk*, speaking of the *Can. Sports. and Naturalist* said[42] "—We are sorry—that this valuable publication ends with this issue. The steady improvement that has marked its course had led us to hope for it a long career of usefulness."

One of the last of his published writings was a critical review[43] of Dionne's *Les Oiseaux du Canada*, issued in 1883.

He was one of the original associates of the American Ornithologists' Union, having been elected at its first meeting on September 26, 1883[44].

Mr. J. H. Fleming has in his possession a little booklet[45] on the front inside page of which appears Couper's signature,—"Wm. Couper 1882 806 Craig St.". Mr. Winn has kindly sent me a copy of Couper's signature, from the minute-book of the council of the Montreal branch, written April 6, 1875, and the writer has received from the Rev. Chas. J. Young a little book entitled *Ornithological and Oölogical List of North America*, by John Krider, Philadelphia, which contains marginal notes by Couper giving a few Labrador, Quebec and Montreal egg dates. This booklet bears Couper's signature at "Montreal 1877." The 1875 signature appears under Couper's photograph accompanying this sketch.

The Rev. Mr. Young, of Vancouver, in a letter to me dated December 22, 1928, says that he knew "Will" Couper well, having called on him at Montreal several times up to 1884. The Rev. Mr. Young speaks of Couper as "a very observant and reliable naturalist and a clever taxidermist." He informs me that Couper left Montreal in 1884 and went to live with his son at Troy, N.Y., after which he heard no more of him. The later years of his life, after the death of his wife, were not altogether happy ones, according to Mr. Young. Mr. Winn tells me that Couper did not resign from the Montreal branch, as far as the records show, but simply dropped out.

NEW YORK STATE (1884-1886 ?).

For this closing chapter in the history of his life we need more information. On May 12, 1884, he was living at 114 Fourth street, Troy, N.Y., and on that date wrote to Prof. William Saunders (then editor of the *Can. Entomologist*) telling him of having collected thousands of Io moth cocoons there during that spring, so he evidently continued to engage himself with entomological work. Saunders paid a tribute[46] to Couper, saying that he would be missed in Canada and spoke of him as "one of the earliest observers and writers on insects in Canada and who has added much to our knowledge of insects and their habits". The above note was Couper's last contribution to natural history literature. He had been a frequent writer in various periodicals for 32 years.

Resorting to Mr. J. H. Fleming, who is at all times ready and willing to assist with needed information, he suggested that I write to Dr. Charles C. Adams, Director of the New York State Museum at Albany, N.Y., The result was that Dr. Adams kindly gave me the following interesting facts, in a letter dated December 13, 1928,—"Your letter of December 11 is here inquiring about William Couper. I called upon Mr. Champlin of the State Library who is very skilled in running down such items and he reports

[41] *Trans. Ottawa Field-Nat. Club*, No. 4, 1883, p. 14
[42] *Auk*, Vol. 1, 1884, p. 206.
[43] *Can. Sports. and Nat.*, Vol. 3, 1883, pp. 237 & 245.
[44] *Can. Sports. and Nat.*, Vol. 3, 1883, p. 270; *Forest and Stream*, Vol. 21, 1883, p. 183.
[45] *Geography of Newfoundland*, by James P. Howley, 1876.
[46] *Can. Entomologist*, Vol. 16, 1884, p. 96.

to me as follows:—William Couper's name is found in the Troy, New York, Directory for 1884, stating that he is a naturalist and taxidermist—. He advertsied to stuff and mount quadrupeds, birds and fishes to imitate nature. In 1885 his business address was 35 Wotkyns Block and his residence 517 Whipple Ave., Lansingburg (only a few miles from Troy)—. In 1886, his address was 517 *Fifth* Ave., Lansingburg—.From 1887 to 1891 his name was not in the Directory."

Cassino's *Naturalists' Directory*, 1886 edition, gives 518 Whipple Ave., Lansingburg, as Couper's address. This information is repeated in the edition of 1890 when Couper was said to have been carrying on a taxidermical and entomological business at that address. This, however, may have been simply reprinted from the 1886 editon as the Troy directories contain no record of him there after that year.

The Department of Vital Statistics at Troy inform me by letter that they have no record of William Couper's death either at Troy or Lansingburg and a request to the Division of Vital Statistics for the State of New York, at Albany, elicits the information that a search of their records from 1886 to 1890 (inclusive) reveals no record of his death in the State between those dates. It is fairly certain, however, that Couper died at his son's residence at Troy about or possibly in the year 1890.

His name does not appear in Cassino's edition of 1892 and Dr. William Brodie in 1894 spoke of the "late Mr. Couper".[47]

[47] *Biological Review of Ontario*, Vol. 1, 1894, p. 103.

MEMOIRS OF THE EIGHTIES

By NORMAN CRIDDLE

THE following notes have been put together with the object of recording the local condition of wild life at Aweme, Manitoba, before it was altered by the development of agriculture. The fragmentary nature of the records will be understood when it is known that I was, at the time these observations were made, a boy ranging from seven to fourteen years of age without any previous knowledge of the creatures met with. In partial extenuation of these obvious shortcomings it can, I think, be truthfully claimed that I took more than an average interest in wild objects. My mother had taught me to recognise several of the common English birds before I left that country, she also reared caterpillars and I became, in consequence not only familiar with the butterflies and moths into which they developed but also with their food plants. I was likewise fortunate in having as associates my brothers Evelyn and Stuart as well as Messrs. Edwy, Harry and Cecil Vane, all keen observers for whose assistance in preparing this paper I am much indebted. Finally I had access to the diary of my father, Percy Criddle, who, as is shown by his reports on bird migration, took more than a passing interest in natural history. He had, moreover, by June, 1884, made a collection of 169 species of Lepidoptera.

It was on August 24, 1882, after a 23-mile drive from Brandon with oxen, that we first saw the land which was to harbour and support us for so many years. The homestead on which we pitched our tents had never received the touch of a cultivator and, apart from the influence of Indians and fur traders, it was still adorned in all its natural wildness. Man, however, had already left many evidences of his baleful influence; the buffalo, once abundant, were now only represented by innumerable bleached skeletons; other animals had also felt the effect of that early "civilization" for, be it known, we were residing within three miles of Brandon House, one of the early Hudson Bay Company's forts, though then long deserted. The remains of Assiniboine House, built by the North West Company and Fort Souris of the X.Y. Company, were also close at hand. The old Yellow-quill trail, with an almost prehistoric tradition, and now marked by Red-river carts, might still be followed to Portage la Prairie.

Now, just a few words about the place we arrived at that August evening. The tents had been erected close to the edge of some aspen poplar groves with a stretch of open prairie to the west. On the east were more woods which in reality formed a wide margin to a large marsh where still stood a few giant poplars; a remnant of a former forest, which now lay scattered round about, killed by the floods of the two preceding years. In this marsh, tall rushes, sedges and grasses intermingled with dead willows and made of the whole a tangle where any animal might safely hide. There were also sandy hills and thickly grassed flats. Indeed the locality was an ideal one for wild life and it had, without doubt, once supported a much larger fauna than was present when we arrived upon the scene.

My recollections of the wild things that first autumn are not very extensive. I know that mosquitoes were very much in evidence, also that my father tried to shoot a deer without success. Several ducks and some Sharp-tailed Grouse were secured, indeed, the latter rose almost at our feet and their whirr of wings and cackle were quite startling. Other incidents that dwell in my memory include a visit of a Badger to the tents, the discovery of a large Sphinx caterpillar in the crop of a grouse, a flock of geese passing close by and numerous Sandhill Cranes travelling southward.

Later, as winter set in, we moved to a newly erected log house but the only incident of a natural history nature that I can recall there, was the loud drilling of a woodpecker on the logs which we, at the time, mistook for a bear. The following extracts from my father's diary seem worthy of insertion:—

"August 18, 1882.—Saw lots of prairie hens and ducks, shot two of the former.

"August 19.—Shot more prairie fowl.

"August 25.—Shot three ducks.

"October (date unrecorded).—Geese moving south in great flocks; also no end of ducks."

The spring of 1883 came, as my memory recalls it, with the blooming of anemones, the deafening croaking of frogs and the musical jangle of blackbirds. All were in countless numbers and the last named later became a pest of the grain fields. Ducks, from Mallards to Teal, were everywhere and more than one Bittern fell victim to a gun under the belief that it was a much larger bird. They were eaten, however, with relish despite an occasional snake protruding from their beaks.

One event that was stamped upon my boyish mind was the purchase of a haunch of venison from an Indian. There were a number of these people about but we always treated them kindly and they proved to be quite peaceful. I insert a few additional notes from my father's diary covering this time:—

"April 13, 1883.—All round us now is one continuous, horrid row from the frogs which never for an instant cease croaking.

"August 8.—A visit from Dr. M. Christie and E. T. Seton. Learned discourse on natural history.

"August 10.—Visitors returned wet through, having been lost trying to get back to Carberry.

"August 24.—There are lots of ducks and chickens about.

"September 13.—. . . Strictly speaking, however, the natives (settlers) know no game laws and would shoot a bird on its nest had they a chance."

My memory of the next few years is somewhat confused; the period was one of extreme depression, crops had been poor and prices very low. Hunger generally accompanied us in our daily work, but boy-like, we forgot its pangs in the interests around us and as a substitute for bread, learned to eat Cree Turnips (*Psoralia esculenta*), a root for which I still retain a liking. From my father's diary of this time it may be noted that Snow Shoe Rabbits were numerous and these, with the equally plentiful Sharp-tailed Grouse and Ducks, did much to prevent starvation, even if they did not always stave off the pangs of hunger.

The following notes will give an idea of the prevalence of the commoner forms of wild life as recognised by us during the period under review:—

CANADA GOOSE.—These birds, so far as I am aware, never nested in the vicinity of our home, though they reared their families a few miles away. Indeed, a few breeding pairs were known to be present in what now constitutes the Spruce Woods Game Preserve, up to about 1905, but the excessive persecution to which the birds were subjected at that time by hunters, evidently eliminated, or drove away, the few individuals which had previously nested in our part of the country.

SNOW GOOSE.—These geese, as migrants, often passed over in enormous waves, their shrill cries and shiny-white plumage providing easy marks of recognition. The species was then, as now, nearly always accompanied by a few Blue Geese. There were occasions in early days when sportsmen secured very large bags of Snow Geese but as a rule the birds did not remain in our province long enough to suffer greatly, and on that account they are still comparatively plentiful.

SANDHILL CRANE.—This bird was one of the most conspicuous examples of our avian fauna. A magnificent bird with a splendid voice which carried far beyond the reach of human vision. These cranes, according to early explorers, had long been accustomed to rear their young among the marshes and bogs of the province and during the time I am writing about they were still carrying on their family duties. To us their chief attraction lay in the numerous small flocks moving in spirals overhead and in the loud cries which the birds uttered as they viewed the landscape below. Many a rifle bullet went speeding harmlessly in their direction but they heeded it not. These cranes, due to their shyness, were never extensively shot and the reason for their gradual disappearance from all the settled areas of Manitoba must be credited to some other cause. In all probability it was brought about through disturbance of the birds on their nesting grounds. At

all events they have become quite rare and the sonorous cries so familiar in boyhood days are now little more than a memory.

UPLAND PLOVER.—Of the upland birds, none was more conspicuous than this sandpiper. It was very plentiful and exceedingly tame. The birds used to arrive in pairs and they might be seen at all times of the day, moving quietly among the herbage, or when love inspired the male he would rapidly rise to higher elevations where lark-like he poured forth his musical effusions. Perhaps more attractive still was the return to earth when falling like a meteor he would suddenly check himself at the moment of alighting and with elevated wings, held for a moment in suspension, come gracefully to rest beside his mate.

In their wanderings in search of insects these birds frequently approached very close to the house and it was then easy to note their every movement. Nests and eggs were often discovered, the chosen site for the former being usually the margin of some low clump of trees. Unfortunately the hard-pressed settlers discovered in these birds a savoury article of diet and being short of ammunition found little difficulty in securing the pair at one shot. Thus in time these beautiful birds grew less common and more wild. The ploughing up of the prairies also deprived them of many nesting places. The species still nests in the vicinity but in very greatly reduced numbers. It now enjoys permanent protection in Manitoba but for some reason this immunity from hunters is not having the effect one might expect. It would seem, therefore, that it must be suffering elsewhere. Is it, I wonder, that the birds are being destroyed in their winter homes? Their increasing shyness would indicate that this is so.

GOLDEN PLOVER.—This was another bird with which in those early times, we were very familiar but which has since become rare. These birds seemed to have a special attraction to burnt over or newly ploughed land. I can recall instances when they were seen in large numbers resting upon such areas. The sight was a very attractive one and it still dwells vividly in my memory. These migratory flocks were always much greater in spring than in autumn.

Nearly all the inconspicuously marked birds escaped our attention though there were a few to which we attached names of our own, the real ones being then unknown to us. Of these The Western Meadowlark drew most attention and we christened it "King Syble-a-bon", a name derived from one of its songs in which the bird was interpreted to sing "I am King Syble-a-bon". Another, the "Puta-puta Bird", its name taken from an air song, was later identified as Wilson Snipe; a species evidently nesting in some numbers amid the marshes. There were several strange voices in those lowland thickets the owners of which for a long time remained unknown. One of these was a series of long, drawn-out, liquid notes, later associated with the Sora. There is little doubt that most of the blackbirds nested there, though not the Yellow-head. To see a Redwing chasing a too obtrusive hawk or crow was a daily sight and I remember on one occasion seeing a Bronzed Grackle carry off a young sparrow. A habit that drew frequent attention in these low areas was the tumbling antics of the Marsh Hawk which we designated as "Mad Hawk". Many sandpipers were present but unrecognised. There were also certain bulky nests among the rushes afterwards discovered to be those of marsh wrens.

On the uplands were encountered a few Long-billed Curlew, evidently engrossed in domestic duties, also several small birds such as Prairie Horned Larks, Titlarks and Vesper Sparrows, to all of which we gave names. Mention might also be made of the "Butterfly Bird", recognised later as the Chestnut-collared Longspur, the local name having reference to the fancied resemblance of the bird in song-flight to a butterfly. The Bobolink, another common species was known as the "Chatterbird". Several Burrowing Owls were seen during this period, being usually associated with old Badger holes.

The Prairie Chicken, Pinnated Grouse or "Square-tail", to give its more common names, entered Manitoba in 1882 but it was not recognised at Aweme until 1888 when Mr. Harry Vane shot a male. For a time this fine bird increased very quickly but it has lately become rare again. This present scarcity is doubtless due to the same causes which of late have proved so detrimental to other members of the grouse family.

It is interesting to recall that the abundance of bird life in past days included a much more numerous predatory fauna. Hawks, especially the larger forms, such as Swainson's and the Red-tail, were quite common; attention to the former often being drawn by its shrill whistles as it circled high overhead. Marsh Hawks, too, reared their families all round us and the beautiful Sparrow Hawk was a familiar object in the landscape. There were many alarms of hawks after poultry, the former in those days, being somewhat generalized and shot on sight. Moreover, there is no doubt Marsh Hawks and the larger buzzards did, at times, take young chicks and on an average we perhaps lost three or four each summer, but among the robbers thus grouped together were included both the Duck Hawk and Goshawk, the

former being much more numerous then than it is now. Nearly all the owls were more plentiful, this was particularly true of the Long- and Short-eared Owls and also of the Snowy Owl. All were shot when opportunity offered, the last named being considered a particular prize.

Referring to mammals, it may be noted that the Elk had formerly inhabited all the wooded country of south-western Manitoba. It was present in the nearby spruce woods in 1890, though in greatly reduced numbers and it soon afterwards vanished from all southern districts.

Mule deer, on the other hand, maintained themselves well into the present century and it was only with the spread of the "Flag-tail" (White-tailed Deer) that the former began to grow scarce. Whether the hardy "Flag-tails" have actually driven the Mule deer away is a question that cannot now be definitely answered, but the circumstantial evidence strongly indicates that this is so. There were no "Flag-tails" present during the times I am writing of, but the discovery of a few old horns in the vicinity shows that these animals had once inhabited the territory. The reason for their disappearance and return is a matter for speculation. One wonders whether the Mule deer also had their previous times of rarity and abundance?

The Moose, as was shown by old horns and dung beneath the moss, had once been widely scattered through the country. They were still present in small numbers when we arrived, and they have survived in the Spruce Woods Game Preserve even to the present time.

The Antelope had once inhabited all of western Manitoba at least as far east as the mouth of the Souris river, but we never definitely recognised the animal and it had probably vanished before we arrived.

There seems no doubt that many of the fur-bearing animals of the district had been almost exterminated by the fur traders long before we arrived; this was particularly true of the Beaver. There being innumerable signs of the animals' former abundance but extremely few that were new.

Otters, perhaps never numerous, existed along the Assiniboine and Souris rivers and a few of the animals were reported up to about 1890. They were, indeed, present in the Spruce Woods Game Preserve in 1923 but a lack of protection even there has very probably resulted in the final extermination of the species in southern Manitoba.

The Lynx was quite rare, though a few possibly reared their young among the Assiniboine thickets.

The Buffalo Wolf (*Canis nubilis*), once common, had practically vanished with the animal it used to follow and prey upon.

Even Coyotes, to begin with, were uncommon, but they later grew to be much more numerous and at the close of the period under review, had become abundant as well as extraordinarily bold, but while their cries often struck terror into their audience, the animals themselves were never known to attack either adult or child.

Foxes were much in evidence when we first arrived, but in course of time they became less so. Many were poisoned, but I do not think this alone is sufficient to account for their present rarity. There are some people who claim that the Coyote has been an important factor in the Foxes' decrease but the evidence in support of this is far from conclusive. Another suggestion in which there is at least some truth, is that the Indians and others, taking advantage of the bounty on Coyotes, have managed to substitute fox pups for those of the coyote. This, to my knowledge, has been done in some cases and in one instance brought to my attention by my brother Stuart the person who collected the bounty was not aware that the animals he presented as evidence were foxes.

It is probable that the Mink had not yet regained its former numbers while the once common Marten and Fisher, if they still existed, were extremely rare. The same can be said of the Wolverine, which we never actually saw, though one is said to have been shot in the neighbourhood; in former times it used to occur far to the southward.

Weasels, on the other hand, were in large numbers and being classed as vermin they frequently met the fate to which ignorance consigned them. A perusal of my father's diary shows that we lost one chicken from weasels in eight years, but as he also records a plague of mice it seems probable it was these which attracted the weasels to the farm yard.

Both the Badger and Skunk roamed the country much as they do still, though the recent demand for their fur has had the effect of reducing their numbers and in the case of the Badger actually threatens its existence.

Raccoons inhabited a few places along the Assiniboine river and one was killed by a neighbour in 1883. There was also an odd Porcupine to be met with among the heavier timber.

I have already referred to the abundance of frogs, and to these should be added many toads, the long drawn-out music of which is still vividly associated in my mind with the lightning flashes of distant thunder storms. The Tiger Salamander

was another common object of those times, usually ploughed up from some temporary domicile under ground.

Garter Snakes occurred in great numbers and many exaggerated stories were related by neighbours of their size and ferocity. It is hardly necessary to add that they were killed on sight. Common sense, however, eventually prevailed and now for many years, these, with other reptiles, have been permitted to carry on their harmless activities unmolested. Two Hog Snakes were shot during this period though the species was really rather uncommon. Various fabulous stories were told of its powers for evil, the most amusing being that relating to the supposed fatal effect of coming in contact with its breath. Hence the name "Puff Adder". Two other snakes, the Red-bellied and Green, were also observed.

Of the insect population little was then known and nearly all the pests as we recognise them to-day were non-existent. Cutworms, for instance, had hardly begun their insidious work of destruction for which they are now so well known. The Colorado Potato Beetle did not appear in our midst until 1887. There was no Hessian-fly nor Cabbage Butterfly; the Wheat-stem Sawfly, now notorious for the damage it does in western grain fields, was then living a peaceful existence in wild grasses. And so it was with many another insect later to become troublesome. There was, however, an exception in mosquitoes and black flies, which were far too numerous for comfort, but the Horn-fly and Stable-fly had not then invaded our territory.

The alteration in the flora since 1890 has been almost wholly due to the drying up of the ponds, although cultivation and grazing have had their share in bringing it about. Thus the rushes and marsh sedges gradually gave way to dry land plants while the abundant *Equisetum* seems to have been partly eliminated by cattle and horses. In like manner the willows superseded sedges and these in their turn were replaced by poplars.

Manitoba is well known for its luxuriant display of wild flowers but these were particularly striking during the transition period of wet to moderate dryness. Among the plants of special note at that time may be mentioned *Cypripedium parviflorum* and *pubescens*, *Lilium philadelphicum andinum*, *Parnassia palustris*, *Fragaria* sp., *Astragalus* and *Vicia* of several species, *Viola consperca*, *Zizia aurea*, *Castilleja coccinea* yellow form, *Gentiana*, *Convolvulus sepium*, *Scuttellaria* sp., *Stachys palustris*, *Lobelia*, *Epilobium* and a host of *Compositæ*. The common Dandelion (*Taraxacum erythrocarpus*) and Sowthistle had not, at that time, become established. Canada Thistle, on the other hand, had evidently been introduced by the fur traders and a large patch of this weed was present in the clearing near Assiniboine House.

Such were the conditions of wild life, as I remember them, between the years 1882 and 1890. I will now tabulate some of the changes which have since taken place. To begin with it may be said that all the large areas of marsh land and the innumerable ponds have dried up, the water level of to-day being fully seven feet below that of 1882. Most of the land then inundated by water now supports a luxuriant growth of aspen poplar, balsam poplar and small shrubs, while the remainder is under cultivation. The woods round about, thanks to the checking of fires, are now much more extensive and dense than at any time during the period under review. These important changes have naturally had a marked influence on wild life and they must be duly considered in accounting for the faunal changes which have taken place. The following table will give an idea of some of these changes:—

BIRDS

Name	*1882-1890*	*1928*
HORNED GREBE	Common	Rare.
PIED-BELLIED GREBE	Common	Fairly rare.
FRANKLIN GULL	Abundant	Abundant.
BLACK TERN	Common, breeding	Common in migration.
MALLARD	Abundant, breeding	Common migrant.
BALDPATE	Fairly common	Rare.
GREEN-WINGED TEAL	Common, breeding	Common in transit.
BLUE-WINGED TEAL	Common	Less common.
SHOVELLER	Fairly common, breeding	Rare migrant
LESSER SNOW GOOSE	Abundant	Less abundant.
BLUE GOOSE	Fairly common	Rather rare.
CANADA GOOSE	Plentiful	Rare.
BITTERN	Common, breeding	Rare, breeding.
SORA	Common, breeding	Common migrant.
WILSON SNIPE	Common, breeding	Rare migrant.
GREATER YELLOWLEGS	Common	Less common.
UPLAND PLOVER	Abundant, breeding	Rare, breeding.
LONG-BILLED CURLEW	Fairly common, breeding	Rare migrant.
GOLDEN PLOVER	Abundant	Rare.
KILLDEER	Common, breeding	More scarce.
RUFFED GROUSE	Fluctuating	Fluctuating.
PRAIRIE CHICKEN	Increasing	Decreasing.
SHARP-TAILED GROUSE	Abundant	Much reduced.
PASSENGER PIGEON	Rare	Extinct.
MOURNING DOVE	Rare	Plentiful.
MARSH HAWK	Common, breeding	Becoming rare.
COOPER HAWK	Uncommon, breeding	More numerous.
GOSHAWK	Fluctuating in number	Fluctuating.
RED-TAILED HAWK	Common	Much less common.
SWAINSON HAWK	Common	More rare.
FERRUGINOUS ROUGH-LEGGED HAWK	Common	More rare.
DUCK HAWK	Fairly common	Rare.
SPARROW HAWK	Abundant	Rare.
LONG-EARED OWL	Common, breeding	Rare.
SHORT-EARED OWL	Fairly common	Less common.
WESTERN HORNED OWL	Common	Much less common.
SNOWY OWL	Common in winter	Rare.

BIRDS—*Concluded*

NIGHTHAWK	Abundant	Less common.
WHIP-POOR-WILL	Fluctuating	Fluctuating.
CROW	Abundant	More abundant.
BOBOLINK	Very common	More rare.
RED-WINGED BLACKBIRD	Abundant, breeding	Common migrant.
WESTERN MEADOWLARK	Abundant	Lesscommon.
BALTIMORE ORIOLE	Rare	More common.
RUSTY BLACKBIRD	Abundant	Less common.
BREWER BLACKBIRD	Abundant	Less abundant.
BRONZED GRACKLE	Abundant	Less abundant
BARN SWALLOW	Rare	More common.
WHITE-RUMPED SHRIKE	Fairly common	Rare.
HOUSE SPARROW	Absent	Abundant
CATBIRD	Uncommon	More plentiful.
HOUSE WREN	Common	Abundant.
ROBIN	Abundant	Less common.
BLUEBIRD	Rare	Fairly common
MOUNTAIN BLUEBIRD	Much restricted	More common, spreading

MAMMALS

Name	*1882-1890*	*1928*
BLACK BEAR	Uncommon	Very rare.
RACCOON	Rare	Rare.
BONAPARTE WEASEL	Common	Common.
LEAST WEASEL	Not observed	Fairly common.
LONG-TAILED WEASEL	Abundant	Much less common.
MINK	Rare	Rare.
OTTER	Rare	Perhaps extinct in district.
SKUNK	Common	Less common.
BADGER	Fairly common	Becoming rare.
RED FOX	Common	Very rare.

MAMMALS—*Concluded*

COYOTE	Common	Less common.
BUFFALO WOLF	Very rare	Extinct in Manitoba.
LYNX	Rare	A casual visitant.
WILD CAT	Rare	Perhaps extinct in Manitoba.
PORCUPINE	Rare	Perhaps gone
HOUSE RAT	Absent	Abundant.
HOUSE MOUSE	Absent	Abundant.
WHITE-FOOTED MOUSE	Abundant	Abundant.
MUSKRAT	Common	More rare.
JACK RABBIT	Rare	Common.
SNOWSHOE RABBIT	Fluctuating	Fluctuating.
BEAVER	Rare	More common.
ELK	Fairly common	Now gone.
MULE DEER	Abundant	Very rare.
NORTHERN FLAG-TAIL	Absent	Common.
MOOSE	Fairly plentiful	Less common.
ANTELOPE	Reported in 1880	Extinct in Manitoba.

On reviewing these tables it will be noted that out of a total of 55 species of birds listed, 38 have become reduced in numbers, seven are approximately as they were, eight are more numerous, one has been introduced and one is extinct.

Of the Mammals, 14 have been reduced, five are approximately as they were, six are more common and two are no longer found within the province. Of the 14 now more rare, two, if not extinct in the district, are on the verge of becoming so. We might add to this list the Buffalo and Grizzley Bear which had gone before our arrival; also the Wolverine, Fisher and Marten, once forming part of the catch of the trappers connected with early fur-trading, but now exterminated in all southern sections of Manitoba except, perhaps, in the extreme east.

GLIMPSES OF LITTLE-KNOWN WESTERN LAKES AND THEIR BIRD LIFE

By J. A. MUNRO

(*Continued from page 155*)

LAC LA BICHE AND WHITFORD LAKE, ALBERTA

Lac La Biche is remembered chiefly by the incidents which occurred on the journey from Edmonton via Athabasca Landing and the return by way of Sacred Heart and Andrew, and, when, because of rough weather, a general inspection proved impracticable.

A belated start on August 17th, 1922, made it necessary to camp about seventy-five miles north of Edmonton. For the first part of the journey roads were sticky from recent rains, but after thirty miles of brush-covered country the trail entered a thick forest of short poplar and birch mixed with pine where the road was dry and sandy with occasional bad sand hills and sand pits. We came to grief in one stretch of loose sand but fortunately this was close to a saw mill and five athletic loggers came to our rescue. At a small country store, where a stop was made for gas, we received alarming accounts of the trail east from Athabasca Landing and were warned to carry an extra can of gasoline and chains for the front wheels.

Late in the evening camp was made in a patch of thick brush just off the trail. Below us in a hollow, and hidden by intervening timber, lay a small lake whence came the voices of Holboell's Grebe, the quacking and splashing of Mallard and the soft whistle of a Spotted Sandpiper. The night was hazy with the smoke of forest fires. Through this medium the moon first appeared as a smouldering conflagration on the horizon, then,

clearing the poplar tops, showed herself as a flaming orange-red disc.

On these days of constant driving one plays a game of counting the birds encountered by the roadside. This day bird-life had not been abundant and less so after leaving the brush country. Several fair-sized lakes, passed at a distance, contained many ducks and grebe whose positive identification time did not permit. Crows were fairly numerous in the brush; absent for fifty miles; then common again close to our camp where we saw them streaming in to a well populated roost. Migrant Mountain Bluebirds in small flocks appeared at intervals along the trail and the car flushed Juncos, Vesper Sparrows and Savannah Sparrows. Other species noted were: Western Red-tail, Marsh Hawk, Sparrow Hawk, Sharp-tailed Grouse, Ruffed Grouse, Boreal Flicker, Wood Peewee, Kingbird, Rusty Blackbird, Brewer's Blackbird, Siskin, White-rumped Shrike, House Wren and Robin.

Early the following morning we stopped at Athabasca Landing for supplies, including an emergency can of gasoline which was to prove an unnecessary precaution. This famous old settlement beside the strong-flowing river aroused our enthusiasm. How many colourful embarkations for the far off land of romance had it witnessed! But now substantial buildings are the only evidence of its one time prosperity, for the railroad has changed its status from an outpost of civilization to a half-forgotten way station.

The road east, in spite of all foreboding, was on the whole better than the Edmonton-Athabasca trail. It led through a fairly open poplar country which held here and there low-lying stretches of spruce muskeg. I was told that all the good agricultural land between the two settlements (*i.e.* Athabasca Landing and Lac La Biche) had been homesteaded. Many of the farms seemed prosperous and the grain was long-strawed and full-headed, quite the best crops seen in Alberta that summer. There is a negro settlement near Athabasca, and, at a big, clean farmhouse we were served an old-fashioned Southern dinner—so like those of fiction that one wondered whether this was a case of nature imitating art, a thought at once to be dismissed for only nature unaided could have produced the inimitable, southern negress who cooked and served the feast. Smiling an expansive "Aunt Jemima" smile, she stood behind each of our chairs in turn, brushing off the flies with a fir branch and urging us to "try moah" of the fried chicken, corn-bread, new potatoes, and coffee. Later the fly-brushing was taken over by a kinky-haired atom who featured snowy teeth and beady eyes.

In a wide valley a stop was made at the French settlement of Plomondon, where, at the village store we were given spring water too cold to drink, and the proprietor sold us some frozen cheese which had been stored in the well—a well so deep that ice remains in the bottom all summer.

Beyond Plomondon the road follows Lac La Biche for eighteen miles to the settlement of the same name—a pleasant trail where, through open glades of grass-land, one catches glimpses of the lake and of distant islands. Near the Mission, seven miles east of the village, are several dense bog-rush beds one hundred yards or more out from the shore and a thick growth of tule on the lake margin; the water near shore is warm and shallow and thick with short, fine, thread-like algæ. Later we were to discover that this growth prevails over the entire lake. Near the Mission also are several small rush-bordered lakes and grass sloughs quite close to the main lake. About these were many Killdeer, Black Terns and Franklin's Gulls. The latter were also common on Lac La Biche and, excepting Holboell's Grebe, the only water-fowl noted in large numbers.

Few land birds were seen along the trail to the lake, Kingbirds and Sparrow Hawks being the only common species. A Hawk Owl flew out from a clump of spruce and alighted again fifty yards farther into the muskeg where it was secured. This proved to be a male in worn plumage. The Thirteen-lined Ground Squirrel, *Citellus tridecemlineatus*, apparently the only ground squirrel in the district, was observed occasionally.

The road from the Mission to the village was very bad indeed with deep chuck holes full of mud and water. This portion we travelled three times. The first time we floundered through the mud for nearly an hour expecting the village to appear at every turn of the road but as no vestige of civilization appeared it was concluded that a wrong turning had been taken so we turned back again to the Mission. Lucky we did so for we picked up our two spare tires that, unheard, had fallen from a broken carrier. But enquiries at the Mission showed we were on the right road so we turned about again to essay the difficult navigation of the chuck-holes. Had we continued another hunded yards the first time we would have seen the village but then the tires would not have been recovered—so works the law of compensation.

Next we proceeded south to Andrew, the first day travelling as far as the Little Beaver River over execrable roads which wound through open park-like country and hay meadows. Birds were scarce. On a small slough partly hidden in the

timber, near the night's camp, a brood of Ruddy Ducks were feeding, and Bronzed Grackles and Rusty Blackbirds visited the stable yard of a settler's cabin close by.

The day following is memorable because of the hunt for Dejarlais during an eleven-hour drive. My note book records but two birds, a Swainson's Hawk near Ashmont and, near Sandy Lake, a Peregrine that flew ahead of the car and alighted on a fence post. It had rained in the night and the roads, rough at their best, were all but impassable. The main trail in places was a mere winding cattle track and at intersections, where a logging road or haytrail branched off, it was sometimes necessary to hold a council of war. At one such place we overtook a caravan headed for Saskatchewan and stopped for consultation and mutual encouragement. With a compass on the ground we squatted in a ring and finally, by a process of elimination, or perhaps by good luck, decided on a direction that took us to Whitefish Lake, passing en route an Indian encampment where women were drying rabbits in the smoke of a camp fire. The lake looked deep and blue and its marshy bays and steep, wooded shores invited exploration.

Finally we reached Sacred Heart and here the resident priest directed us to Dejarlais—six miles distant. The trail took us into a deep, swampy valley where it wound about in every direction, through wet hay meadows, circling willow swamps and bravely traversing muskegs where the corduroy sank with the car's weight. After travelling, it seemed for many miles, our trail climbed a steep hill to a plateau and dryer ground. Here we looked eagerly for Dejarlais and the North Saskatchewan—in vain. Far ahead was a shack, and, on the dim, distant horizon, a blue ridge of hills. Towards the shack we went and there found an Indian who spoke English. Yes, we were on the right trail and it was six miles to Dejarlais and the river! On we went mile after mile of jolting progress over a maze of trails until finally we slid down a long, slippery hill to the Saskatchewan. But where was Dejarlais? The man in charge of the crazy ferry, interrogated on this point, gave us the pleasing information that six miles beyond the top of the hill across the river we should find Dejarlais.

Dejarlais became an obsession. If only we could reach this magic spot we should be heartened with tea and the load of fatigue would be cast aside forthwith. Up the hill and on southwest for more interminable miles until we overtook two Russian boys on horseback. To them was put the burning question, which by now slipped off our tongues, properly accented, with the ease born of custom—

"How far to Dejarlais?"

"First turning to the right and then six miles straight west!"

So thither we went. Now, at any rate, there would be no more devious turnings and meanderings. The question was next put to a female equestrienne of tender years and engaging aspect.

"How far to Dejarlais?"

"Why, you passed it three miles back!"

So Dejarlais will always hold the glamour of the unattained. We refuse to think of it as a post-office in a farm house!

Whitford Lake, near Andrew, visited again the following season, proved to be a shallow, muddy, alkaline lake surrounded by flat, brushy prairie much of which is being farmed by Galicians. The water has receded in recent years so that the contour of the shore line bears little resemblance to that shown on the latest township map. A large portion of the west end of the lake, indicated as water on the map, is now dry hay land and alkaline flats covered with skunk grass. Eastward, around the main body of the lake, the shores are flat, sandy and fairly hard. Between the water's edge and high water mark is a wide stretch of exposed lake bottom on which grow the usual wiry sedges and skunk grass. Close to the east end of the lake, adjoining its southern shore, is a large area of meadow land where hay had recently been cut (August 19, 1923).

The fractional S.W. ¼ of Section 22, 56, 16, W4, would, at high water, form the end of a rough, grassy peninsula partly wooded along its base. At the present time, however, this fraction and the peninsula also are surrounded by dry lake bottom. To the west is rough, wet meadowland and to the east exposed lake bottom covered with skunk grass.

Island Number One, in the N.W. ¼ of Section 23, is low-lying land more or less covered with slough grass and sedges and at the present time is connected with the mainland, or rather, with the dry lake bottom in Section 22.

About this portion of the lake Mallard and Pintail were fairly plentiful, so also were Lesser Yellowlegs, Black-bellied Plover, Killdeer and Western Willets. A small flock of Bonaparte's Gulls also was observed.

PIGEON LAKE, ALBERTA

The south end of Pigeon Lake is about thirty miles due west of Wetaskiwin. The well graded road from that city continues along the south shore through heavily wooded country past Battle Lake to Yeoford. Beyond Yeoford little work has been done on the road and it is said to be practically impassable for motor cars.

Pigeon Lake is about twenty miles long and six miles wide. It is entirely surrounded by poplars and balm of gilead, with spruce and pine on the flat muskegs which characterize many of the flats between the lake shore and the surrounding ridges. The water is clear but shallow for some distance from the shore. The beach is sandy and there is little weed growth. The water is of good quality and the lake has been suggested as a reservoir for the Edmonton water supply.

A few Greater Yellowlegs, Bonaparte's Gulls, Common Terns, Holboell's Grebes and White-winged Scoters were the only birds noted when I visited the south end of the lake on August 26th, 1922.

Information received from reliable resources was to the effect that very little duck-shooting is to be had on Pigeon Lake and this seems to be confirmed by the general topography of the foreshore.

Apparently it can be taken as a general rule that the clear lakes in the timbered country west of the fifth meridian which have sandy beaches and hard bottoms and where whitefish are plentiful are not frequented by ducks during the migration.

RED DEER LAKE, ALBERTA

Red Deer Lake is one of the most attractive lakes within easy reach of Camrose. The shores are wooded with poplar and willow and the beach in many places is formed of hard sand strewn with small boulders and stained with an alkaline deposit. Cut banks to fifteen feet in height define high water mark along portions of the shore; other portions, for the most part well wooded, slope gradually to the water's edge. The lake narrows at the south end where a number of islands and several well wooded peninsulas add a great deal to its beauty. No marsh growth was noted in the lake. The water is alkaline but various water plants eaten by ducks appear to thrive.

Ducks appeared to be fairly abundant chiefly at the south end of the lake (September 4th, 1922) but there is said to be good shooting at various other points. The fractional south-east quarter of Section 22, 43, 22, W4, is partly under cultivation with patches of brush left on the south-east portion. The soil is light and apparently alkaline. A shallow arm of the lake with muddy shores cuts this fraction in two. The shore east of this arm is harder—sandy beach with some gumbo spots.

The fractional south-west quarter of 24, 43, 22, W4, and the two-acre fraction in the south-east quarter comprises about forty acres of high land, part prairie and part brush, and includes a well-wooded point with steep cut-banks. The beach for the most part is hard clay scattered with small boulders. This parcel would make a very attractive camping ground.

SAMPSON LAKE, ALBERTA

Sampson Lake, formerly known as Battle Lake, is less than two miles west of Red Deer Lake and probably at one time the two lakes were connected. The water level of these lakes had not dropped as low as in many of the lakes to the north. At Sampson Lake the effect of the dry seasons is shown in the marsh lands which are entirely dry and hay had been cut in the summer (1922) close to the water's edge. The shores are muddy with a light growth of sedges and bog-rush, and, further out, masses of sago pondweed. The surrounding land is flat, that on the south and west being covered with brush and polpar, while the north and east sides are open hayland. The farms in the immediate neighbourhood are well cared for and the grain crops exceptionally good for this dry season of 1922.

Several flocks of Mallard and Pintail were seen on the shore and the abundance of feed (Sago Pond-weed and various species of mollusca) would seem to indicate that this lake is a favourite feeding ground.

SYLVAN LAKE. ALBERTA

Sylvan Lake, eighteen miles west of Red Deer, has become a popular summer resort within recent years. A number of cottages have been built and at the time of my visit in the latter part of July, 1922, I was informed that the summer colony numbered over one thousand. The village of Sylvan Lake, situated at the south-east end of the lake, has several stores and hotels which cater to the tourist trade; there are a number of motor boats and sail boats in use beside numerous smaller craft and fishing for pike and perch is one of the great attractions.

The lake lies north-west and south-east and is eight and one-half miles long and two and one-half miles wide at the widest point. The water level is kept fairly uniform by small tributary streams and numerous springs, some in the lake, others rising in a willow swamp at the north-west end of the lake and in several places on the south shore. Shallow water prevails for some distance from the shore, the bottom being alternately stony and sandy. The average depth in the centre is about thirty feet but it is said that a much greater depth is found in a few places. The water is clean, moderately cold and apparently free of alkali.

The land adjoining the north shore is heavily timbered with poplar, cottonwood and a sprinkling of silver birch, while spruce occurs in small isolated stands amidst the deciduous growth.

Some land has been cleared and it is said that good crops are raised. These clearings, however, are screened by the thick timber, and are not visible from the water. The greater part of the beach is narrow and covered with flat water-worn stones. Behind this are deep wooded banks sometimes fifty feet or more in height. Along the village front and around the numerous bays the narrow stony type of beach is replaced by one of clean yellow sand. In some of these bays long stretches of bog-rush follow the contour of the shore, while farther out in the lake are beds of potomogetons.

The country to the south of the lake is more open with many prosperous looking farms operated chiefly by Scandinavians. Here are fewer high banks and some of the grain fields extend almost to the line of high water mark. The proportion of sandy beach is greater than on the north side and here also are large areas of willow-dotted meadow-land surrounded by tall, slim poplars.

Water-fowl shooting in general is said to be poor early in the season, but later on when the northern bred ducks and Canada Geese arrive to feed on the stubble fields, flight-shooting is practiced with considerable success. These birds remain so long as there is any open water in the lake.

Few land birds were seen, the commonest species being Purple Martin, Nighthawk, Yellow-bellied Sapsucker, House Wren, Song Sparrow, Red-winged Blackbird, Brewer's Blackbird, Baltimore Oriole, Vesper Sparrow, Ruffed Grouse and Sharp-tailed Grouse.

A heavy smoke haze from forest fires prevented careful observation of the water-fowl. Numerous half-grown broods of Mallard, Pintail, Buffle Head, American Golden-eye, and Canvas-back were seen, and I was informed that many of the adjacent sloughs, generally used by breeding ducks, had gone dry early in the season. The majority of the pond ducks and also White-winged Scoters are said to have nested some distance from the lake, in the woods and grain fields. Mrs. Cassells of Red Deer told me of finding ducks' nests a mile and a half from the shore of the lake. This habit appears to be a fairly constant one, not only at Sylvan Lake but at nearly all the prairie lakes inspected.

On July 31st, 1922, I visited a small lagoon in a bog-rush marsh at the south end of the lake beside the village and immediately in front of an hotel. Here on a mud bar was a closely packed flock of adult Common Terns and immature Franklin's Gulls. Close beside them on another mud bar a flock of fifteen Black-bellied Plover in full summer plumage had alighted. Scattered over the weed-beds, a mixed company of waders fed busily; Greater and Lesser Yellow-legs, Least Sandpipers, Northern Pharalope, Stilt Sandpipers, and Long-billed Dowitchers in summer plumage, while Solitary Sandpiper, Killdeer and Wilson's Snipe occupied the grassy beach. Baldpates were lined up along the edge of the rushes; Pintails and Blue-winged Teal dipped in the shallow water and a Canvas Back led her nearly full-grown brood into the lagoon among the feeding ducks. Several Brewer's Blackbirds, Coots, Pied-billed Grebe and a drake Canvas-back completed this interesting assemblage.

CYGNET LAKE, ALBERTA

Cygnet Lake was visited on August 1st, 1922, via car from camp at Sylvan Lake.

Some years ago this marshy lake, known locally as Burnt Lake, was a favourite duck-shooting resort of Red Deer sportsmen. It was possible to enter the lake by canoe through the narrow stream that connected it with Sylvan Lake two miles to the north-west. Since reclamation work was undertaken and a branch line of the Canadian Pacific Railway built on a grading across the lake, the water area has gradually diminished and the majority of duck-shooters have gone elsewhere for their sport. The areas which were first effected by the draining of the lake are now grown up with wild hay. This is cut by the farmers in the vicinity and forms a considerable proportion of their livelihood.

In August, 1922, Cygnet Lake was chiefly a dry sandy and peaty flat surrounded by a scanty fringe of bog-rush and sedges. There was a small area of water about six inches in depth and surrounded by deep mud in the south half of Section 25, 38, 28, W4. In this muddy pond a number of surface feeding ducks, a large flock of Lesser Yellowlegs, four Marbled Godwits and other waders were noted. There was barely enough water for stock watering purposes and in all probability the entire lake will eventually dry up.

WAVY LAKE, ALBERTA

Wavy Lake is surrounded by open prairie dotted with poplar and willow bluffs, most of the arable land being under cultivation. At high water the fore-shore on the east and south sides is chiefly sandy beach; the west shore is more or less marshy with several stretches of sandy beach. The water has receded some distance from high water mark and the exposed lake bottom has dried and cracked in the sun. When I visited the lake on September 29th and 30th, 1922, the outer edge of this margin of clay was covered with a thin deposit of water weeds blown in by the wind. The entire lake is shallow, twelve feet being the maximum depth and it was noted that these weeds

covered a greater portion of the lake surface. There is little marsh growth at the south end but towards the north where the lake narrows bog-rush occurs usually some distance out from the shore, in isolated clumps and also in beds of considerable size.

On September 29th and 30th while inspecting the lands described below, large flocks of ducks could be seen on the muddy shore of the lake and in the adjacent stubble. In the evenings a great clamoring of White-fronted Geese was heard and several flocks of Hutchins Geese passed up the lake. Several of the residents mentioned seeing large flocks of "field geese" (white-fronted Geese ?) feeding in the stubble on the morning of September 29th. The following morning I observed a flock of approximately one hundred and fifty Lesser Snow Geese resting in the centre of the lake.

While the lake has receded considerably during the past five years it would seem that the water was even lower in 1913 when the last survey was made for I was unable to locate several fractions.

The lake now extends some distance north into Section 26, 45, 15, W4, and divides the north half of Section 23 into two parcels. This portion of the lake is narrow, shallow and grown up thickly with bog-rush. The fore-shore on the north-east quarter of Section 23 is hard clay and sand; the land portion is rough pasture land with some shallow and poplar growth and includes a wooded point terminating in a bog-rush bed. This point is evidently an island at high water.

The west half of Section 11, 45, 15, W4, comprising a seventy acre fraction is part pasture land with light growth of willow brush on some portions of the low bank which defines high water mark. The balance, originally lake bottom, is grown up with sedges and grass near the margin of the lake and with skunk grass on the dryer portions farther inland. The foreshore is all more or less marshy and soft. The lake in front of these fractions is dotted with clumps of bog-rush but there is none of this growth on the shore. On September 30th several thousand ducks were seen close to the shore in front of the road allowance a short distance to the north and the lake farther out was black with ducks. There should be excellent decoy-shooting here and as grain is grown on the sections to the west there should also be flight-shooting at Mallards.

WIZARD LAKE, ALBERTA

The origin of unusual place names is always a matter for interested speculation; consequently the official designation Wizard Lake, and the equally suggestive local name of Conjuring Lake, aroused a curiosity which the residents politely endeavoured to satisfy. The faculty for myth, it has been remarked, is innate in the human race, thus we should like to believe in the phenomena of ghostly, ancient war vessels, and moving shapes. amorphic, nebulous, and suggesting human faces, that are reputed to haunt the placid waters of Conjuring Lake. But, alas! only residents see these marvels so one reluctantly concludes that in the nomenclature lies their inspiration.

When we drove to Wizard Lake on September 9th, 1922, the air was clear and still, the ground stiff with the silver of a heavy frost. Passing through half a mile of tall, symmetrical poplars—so pale of bark that an occasional silver birch among them might easily pass unnoticed—we reached the steep, wooded shores of this delightful lake. Long, narrow and deep it lies between sheltering, timbered hills, tempting the naturalist to explore. Before making the abrupt descent to the water's edge we lingered to watch migrant Hermit Thrushes and Myrtle Warblers in the tree tops, and a flock of Robins scratching amongst new-fallen, yellow poplar leaves. Overhead white cloud-billows drifted on a turquoise sky and the lake responded with a glorious blue—hardly supernatural, but, marvel enough we felt. Of all the lakes within easy reach of Camrose and Wetaskiwin this, we thought, was the most attractive.

That portion of the lake lying in Sections 1 to 6 in 48-21-4. is surrounded by steep banks varying from 50 to 150 feet in height which, except for one burnt area on the north side, are thickly timbered. The beach is narrow and sandy, the water shallow for a short distance out, then deepening suddenly. Along shore a growth of splatter dock is general while here and there are patches of bog-rush, the largest areas outlining and extending into the lake beyond numerous sandy points more or less covered with coarse sedges. In the narrows, situated chiefly in Section 7-48-21-W4, the lake is shallow and probably less than forty yards in width. Here the marsh growth is heaviest and the surrounding hills of less height and farther from the water's edge.

Ducks were not plentiful when I visited the lake but a fairly good flight is said to occur late in the fall. At this time also geese settle on the lake. It is probable that Wizard Lake will never be notable for its duck shooting as the main migration through Alberta is confined to the prairie proper. The portion in Section 6-48-21-W4, is probably the best stand for flight shooting but so narrow is the lake that decoy shooting should be fairly good almost anywhere. For the summer visitor there is an abundance of pike and pickerel in the clean, fresh water and excellent

camping grounds are to be found on its shores. These, no doubt, will be used by sportsmen to a greater extent than is now the case when a road is opened to the lake shore.

WANISON LAKE, ALBERTA

Wanison Lake is approximately one and three-quarter miles long and three-quarters of a mile wide. The shore on most of the west and north sides is boggy with a thick growth of tules, bog-rush and sedges. The east shore is harder and the marsh, composed chiefly of bog-rush, is more scattered.

The south-west, the north-west and the north-east quarters of Section 8, 52-20-W4, adjoin the north and west shores of the lake. The marshy shores and the beds of bog-rush extending some distance into the water indicate that the fore-shore of these lands would provide good duck-shooting. The land on these fractions is very rough and hilly and covered with poplar and birch.

There are two islands on the north-east quarter of 8, one of about six acres was burnt over some years ago and has since grown up with brush; the other, somewhat smaller, is covered with large spruce. The two islands which comprise the south-east quarter of 8 are timbered wtih spruce and have more or less rush growth along the shores.

I was informed that good flight-shooting was to be had from the shores of these islands and that duck-shooting at practically any point on the lake, according to the direction of the wind, was usually excellent.

(To be continued)

ECHINODERMS FROM THE GULF OF ST. LAWRENCE

By FRITS JOHANSEN

IN THE autumn of 1926 I made a bicycle trip along the south side of the Gulf of St. Lawrence, from Miramichi Bay to Pictou, also visiting the west end of Prince Edward Island, and along the east side of the Bay of Fundy, from Windsor to Yarmouth, N.S. I collected a number of fishes and marine and freshwater invertebrates; the Echinoderms have been kindly identified by Dr. A. H. Clark of the U.S. National Museum, Washington, D.C., as follows:— (Numbers in brackets mean number of specimens.)

HOLOTHURIDEA

Psolus fabricii Dueben and Koren.

Beach at Escuminac Point, N.B., middle of August, 1926 (1).

ASTEROIDEA

Asterias vulgaris (Packard).

Beach and shorewater at Escuminac Point, N.B., August, 1926 (6).

Beach and shorewater at Cape Tormentine, N.B., September 10, 1926 (2).

Leptasterias littoralis (Stimpson).

Shorewater at Pugwash, N.S., September 19th, 1926 (1).

Shorewater at Pictou, N.S., September 22nd, 1926 (1).

Henricia sanguinolenta (O. F. Mueller).

Beach at Cape Tormentine, N.B., September 10th, 1926 (1).

ECHINOIDEA

Strongylocentrotus droebachiensis (O. F. Mueller).

Beach at Escuminac Point, N.B., middle of August, 1926 (2).

Dr. Clark has also kindly identified the following Echinoderms from the Gulf of St. Lawrence found in the Government collections in Ottawa, but not hitherto published:—(Numbers in brackets mean number of specimens.)

OPHIUROIDEA

Ophiozea robusta (Ayres).

Dalhousie Harbour, Bay of Chaleur, N.B., 15 fathoms (1).

Ophiopholis aculeata (Linneus).

Dalhousie Harbour, N.B., 15 fathoms (31).

Gulf of St. Lawrence (1).

ASTEROIDEA

Henricia sanguinolenta (O. F. Mueller).

Dalhousie Harbour, N.B., 15 fathoms (1).

Prince Edward Island, low tide, summer of 1883, John Macoun Coll. (1).

ECHINOIDEA

Echinarachnius parma (Lam.).

Low tide on Prince Edward Island, 1883, John Macoun Coll. (3).

THE CARDINAL AT TORONTO, ONTARIO

By R. J. RUTTER

RECORDS of the Cardinal Grosbeak (*Cardinalis cardinalis*) at Toronto extend back to the year 1900, but not until 1928 were the birds common enough to justify hope that they had become permanently established.

From 1902 to 1917 there seem to have been few Cardinal observations recorded, though it is interesting to note that in Fleming's "Birds of Toronto" published in *The Auk* of 1907 the bird is listed as "accidental, probably occurring only in winter." From evidence at hand there is reason to believe that they nested here as early as 1921, but the first positive breeding record was made in 1922 when a nest with young was found. In spite of this, from that year until 1928 there were only occasional sight records from widely separated localities and at long intervals. Early in the year 1928, however, reports began coming in of Cardinals wintering in various parts of the city, and, as both sexes were seen it seemed reasonable to hope for nesting records in the following spring. That this hope was not unfounded is shown by the following data.

One nest was built in some shrubbery near a summer cottage on Toronto Island in the early summer. Its progress was closely watched by residents but unfortunately the young were destroyed by some unknown agency. It was not until after this tragedy had occurred that local ornithologists learned of the existence of the nest but sufficient evidence was collected to make the record throughly reliable.

On May 27, 1928, the writer located a nest about a mile east of the city in a fairly heavily wooded valley. The nest was situated in a cedar (*Arbor vitæ*) which partly overhung a small stream and was placed among the outer branches about twelve feet from the ground. The three eggs were hatched about May 30 and on June 13 the young had left the nest and one was found, being fed by the adults, about a hundred yards from the nest tree. On being collected, the nest was found to be composed of rootlets, strips of bark, weed stalks, and a few pieces of paper. This locality was not visited again during the remainder of the summer but on December 23, 1928, the writer and a companion, while assisting with the Christmas Bird Census of the Brodie Club happened to pass the nest site, and, looking up, discovered that a second nest had been built in exactly the same spot. This proved to be a duplicate of the first, even to the pieces of paper used in construction.

At the present time the appearance of one or more Cardinals on a local list is not looked upon as being very extraordinary. On October 14 the writer observed three, two males and one female, during a morning walk on the outskirts of Toronto, a record, which, a few years ago, would have been considered remarkable. The future progress of these beautiful songsters in this locality will be watched closely by all bird lovers.

For information on early Toronto records and an account of the 1922 nesting, I am indebted to Mr. Jas. L. Baillie of the Royal Ontario Museum of Zoology.

NOTES AND OBSERVATIONS

THE DISTRIBUTION OF THE BASSWOOD AT PARRY SOUND, ONTARIO.—Geologists commonly refer to the field relations of one rock with another. A different type of field relation, involving *Tilia americana* (basswood) and crystalline limestone was discovered in the summer of 1928 while doing geological work near Parry Sound.

The basswood is sufficiently uncommon in this district to deserve special note in any description of the timber. Similarly the limestone was sufficiently uncommon to merit some detailed study. While engaged in mapping these limestone formations it was noticed that basswoods were commonly present near such outcrops. As the work progressed it began to appear that these trees occurred nowhere else. To determine this point a close scrutiny was made during the remainder of the summer for basswood and in no case was one found at any distance from an outcrop of limestone.

Practical use was made of this relationship in tracing limestone formations in burned-over country. The basswood grew in small clumps and its conspicuous foliage was easily separated at a distance from that of the other second-growth trees. The limestone commonly occurred in hollows between ridges of harder rocks and was largely covered with only occasional small outcrops. By following the basswood clumps much time was saved in locating the limestone.

The writer has been unable thus far either to discover any other recorded case of this kind or to determine the exact relation between basswoods and the limy soil in which they seem to thrive at

Parry Sound. It seems undoubted that such a relation does exist here, and it is to be hoped that more information will be forthcoming to supplement these observations.—H. W. FAIRBAIRN.

RE-MATING OF RED-BREASTED SAPSUCKERS.—On June 14 and 16 respectively, in 1927, two Northern Red-breasted Sapsuckers, (*Sphyrapicus ruber*) were captured at their nest in our grove of aspens near Barkerville, B.C., and banded, the male, or at least the more brilliantly coloured bird, on the right leg and the female on the left. On April 15, 1928, a pair banded in this way appeared in the same grove and began cutting a new hole. Characteristically, this was abandoned for a time and two others begun. One of these was pushed on until it hid all but a part of the worker's tail, yet both were abandoned in turn in favour of the first, which was finished and occupied. On July 14 we contrived to catch the female, which proved, as we expected, to be one of the birds banded in 1927. We failed to catch the male. Considering, however, the "right-and-left" banding, and the fact that no other sapsuckers have been banded within at least several hundred miles of this place, we think the evidence suffices to establish a record of mating two consecutive years by the same pair. More interesting than the mere fact of remating is the fact that the birds arrived on the same day and probably together or very close together.

Although other Sapsuckers have been here since April 15, no banded individual has appeared in 1929.—THOMAS T. MCCABE, ELINOR BOLLES MCCABE.

WHO BANDED THIS GULL?—The National Parks of Canada Branch, Department of the Interior, Ottawa, which is keeping the file of official Canadian bird banding records, received a report on April 3, 1929, from Mr. Kenneth Alexander, Hope Point, Long Bay, Gambier Island, British Columbia, enclosing a pink celluloid poultry band and a piece of blue rubber from the trade mark of a Fleet-Foot running shoe. Mr. Alexander stated that the band, holding the rubber, was taken from the leg of a Glaucous-winged Gull, which died from the effects of oil, and was found at North Bay, Gambier Island, British Columbia.

An endeavour is being made to trace the origin of this band. The National Parks of Canada Branch would appreciate very much hearing from any person who has information concerning the placing of this band.—HOYES LLOYD.

CHICAKADEES CAUGHT BY TANGLEFOOT.—For many years the apple growers of the Annapoils Valley, Nova Scotia, have endeavoured to protect their orchards from the ravages of the Canker Worm by the use of a sticky substance commercially known as "Tanglefoot". This concoction is prepared by mixing castor oil and melted resin, in proper proportions, and is applied to the trunk of the tree in the form of a band, the idea being to prevent the female moths, which are flightless, from crawling up to deposit their eggs on the tips of the twigs, as is their custom. This measure of control is very effective and inexpensive as well, and practically all careful and successful orchardists have adopted it. November is the time of year the Tanglefoot is used, and it is interesting to examine the trees to note the numbers of unfortunate insects that are often thus ensnared, hundreds sometimes being found on a single trunk.

The Black-capped Chickadees are one of the natural enemies of these insects, and, in searching about the rough bark of the apple trees, they quite frequently themselves get caught, and are helpless in a very short while. During the past three years, I have heard of five Chickadees being discovered stuck hard and fast to the trunks, in two of which cases the birds were dead and the other three were brought to me in a pitiful state. Ether was used as a possible means of dissolving the Tanglefoot, which in each case was plastered more or less all over the little victim, but my efforts to save them so far have been futile.—R. W. TUFTS.

STARLINGS IN FREDERICTON, N.B.—During the first week in January, a lady told me that black birds were coming to her yard and eating food that she put out for pigeons and house sparrows. I told her that the birds must be Starlings as our native blackbirds all migrated. I rather forgot them until March 3rd, when I saw three unfamiliar birds myself. They were above my head in some elms, so I could not be sure of their plumage. Not until two of them dropped down a distance and began squabbling with some house sparrows over a hole in a tree did it strike me that they must be Starlings. I took note of their long bills, short tails, dark colour, song—half whistle and half chatter—their size larger than the sparrows but smaller than a Robin and then the time of year and was satisfied in my own mind that they were Starlings.

I sent a notice to the local paper and asked if anyone else had seen and identified the birds, and if so, would they let me know. A city clergyman phoned me that he had seen seven Starlings on the 25th of January. An Englishman, who was very familiar with the Starlings in England, also told me that he had seen and heard one.

I believe this is their first appearance in Fredericton, N.B.—SUSAN K. SQUIRES.

EVENING GROSBEAK (*Quoted from the Diary of Mrs. Anna E. MacLoghlin, Hamilton*).—"On July 5, 1925, a pair of Evening Grosbeaks were seen picking weed-seeds from the ground at Camp Billie Bear, Muskoka. They allowed me to approach within about ten or twelve feet of them before giving a startled call and flying away. This was the only time I saw them, but Mrs. Hill said they had been seen around the farm buildings for several weeks, and came often quite close to the house.

"The camp is surrounded by dense woods, which in some places are impenetrable."

These birds are known to breed in Manitoba and Minnesota and there seems to be no good reason why this pair should not have been nesting in Muskoka.—W. E. SAUNDERS.

BOOK REVIEWS

A MANUAL OF EXTERNAL PARASITES. *By Henry Ellsworth Ewing. Chas. C. Thomas, Springfield Ill., and Baltimore, Md., pp. 225, 96 figs. $4.50 post paid.*

From the preface we learn that:—"In this manual of ectoparasites an attempt has been made to give a background to a study of the different groups . . ." It is believed by the reviewer that the effort has been admirably achieved.

The work deals with the parisitic mites, ticks, biting lice, sucking lice and fleas. Keys are given to the sub-orders, families, sub-families and genera. As a rule the subject matter is restricted to those genera the species of which infest vertebrate animals and only rarely are those forms found upon the lower creatures included. The short, concise, descriptions of essential parts which follow the keys should prove a valuable aid to an understanding of the families and genera, and the life-history notes are both interesting and instructive. At the end of each chapter is given a summary of the more useful methods of control and a reference to the most important literature on the subject.

A work dealing with ectoparasties has been greatly needed due to the fact that the literature generally is scattered through many publications, and is written in several languages. By bringing many of the known facts together in one volume the author has therefore conferred a great favour upon all those who are interested in the subject. For the student who intends to make a study of any of the groups discussed the book will prove an almost indispensible aid.

It is, we presume, natural for a writer dealing with a group of animals inhabiting the whole world to give emphasis to those species found within the bounds of his own country but the practice, rather common in United States writers, of overlooking workers north of the international boundary is disappointing and we hardly expected a man of Mr. Ewing's ability to follow it. The omission is particularly noticeable in the chapter dealing with ticks, from reading which, it might be suspected that either species stopped at the international boundary or that nothing was known of them to the northward. We cite as an instance from notes on the rabbit tick, *Hæmaphysalis leporis-palustris* Pack., which in the book before us is said to be "found throughout most of North America south of Canada . . ." whereas it has been recorded in Canada from coast to coast (see Hewith; Trans. Roy. Soc. Can. Vol. IX, 1915). However, while omissions such as this are regrettable, they only slightly deter from the general merit of the work. The book is excellently illustrated largely from the author's own hand and printed on good paper. We believe the writer is to be congratulated on a notable achievement.—N.C.

THE CHANGE IN IDEAS ABOUT FORAMINIFERA. *J. J. Galloawy. The Journal of Palæontology. Vol. 11, No. 3, September, 1928. pp. 216-228*

Under the above title, Prof. Galloway of Columbia University has prepared an excellent brief account of the various conceptions which have prevailed concering Foraminifera from the earliest historic times to the present. These fossils are mostly of microscopic size; but there are some microscopic forms like the numulites which have about the size and shape of a penny. For about 2000 years the disc shaped numulites in the rocks of the pyramids which were noted by Herodotus as early as the fifth century B.C. were regarded merely as curiosities. Agricola and others after the middle of the sixteenth century recognized these objects as organic strutcures. Montfort (1808) named fifty-five genera but treated them as univalved shells. Alcide d'Orbigny, whose contribution to the study of the Foraminifera was of epoch making importance held the view that all life became extinct with each geological age and that similar but slightly different faunas and floras were recreated for each succeeding period. D'Orbigny at first classed the foraminifera with Cephalopods, but later abandoned this view. Felix Dujardin showed in 1835 that the Protozoa

lacked circulatory, nervous and respiratory systems and were much lower in organization than the cephalopods. This recognition of the Foraminifera as Protozoa was promptly accepted and the Foraminifera were afterwards classed in the Rhizopoda. In connection with his important contributions to the study of the structure of the Foraminifera, W. C. Williamson in 1848 advanced the view that the supposed differences between species could more easily be explained as individual variation. Williamson developed his idea of variation still further at a later date objecting to the wholesale naming of species and genera and insisted that specific limits could not be set. He argued that all attempts to group the genera of Foraminifera into classes or orders "have been utterly worthless, because based on features upon which no reliance can be placed", (Recent Foraminifera of Great Britain, 1858, Page 19). Williamson propounded the very significant and still unanswered question,—"Are these species of foraminifera, and if so what are the criteria by which they may be distinguished?" Williamson held that (page 12) "little value can be attached to the Foraminifera either in determining the relations between zoological provinces or in identifying stratified despoits." Prof. Galloway points out that Williamson's conception of most of the different forms representing merely individual variations has had large influence on the great English school of students. A discovery made in 1880 by Munier-Chalmas explains in some degree the extreme views held by Williamson concerning the great variation of Foraminifera. Munier-Chalmers found that there were two forms of individuals in the same species, the megaspheric and the microspheric. In 1894 it was established by J. J. Lister that these two forms were due to alternation of generations. "The microscopic form gives rise to a sexually produced young which develop into megaspheric adults, which are much smaller than the microspheric form; the megaspheric form gives off zoospores, which are the result of mitotic division in the nucleus, and which unite and form the sexually produced generation, the microspheric form." This important discovery of Lister's makes it clear now that many species formerly supposed to be distinct and sometimes genera may represent the same species. Recognition of alternation of generations makes the nomenclature of Foraminifera an exceedingly complicated matter. In 1887 came Neumayr's first attempt at a "natural classification" in which three principle groups were recognized, the irregularly formed arenaceous forms, the regular agglutinated forms and the calcareous forms. The first classification based on descent was published by Rhumbler in 1895. R. J. Schubert in 1907, Prof. Galloway thinks, came closer than any of his predecessors to establishing the true relationship of the different forms of the Foraminifera. He stressed the importance of ontogenetic stages and applied as criteria for all natural classification, morphology the law of recapitulation and geologic range.

In spite of the extraordianry difficulties presented by the Foraminifera in the matter of drawing specific and generic lines they have been used very widely in determining geloogical horizons in the oil fields because they are generally the only fossils available. The development of oil fields in recent years has developed a new interest in this class of fossils because their microscopic size saves them from the destruction which the tools deal to all of the larger fossisls. The application of micro-palæontology to oil geology began about 1917. There are now, according to Professor Galloway, more than 300 micropalæontologists, using fossils as an aid to the determination of geological structure and stratigraphy. About 900 genera and approximately 9,000 species of Foraminifera have been described and named but the nomenclature of genera and species is still in such a chaotic condition "that one student of Foraminifera cannot tell what form another student is speaking of or writing about except by figures or specimens."—E. M. KINDLE.

COREGONID FISHES OF THE GREAT LAKES, *by Walter Koelz, Ph.D., formerly Associate Aquatic Biologist, U.S. Bureau of Fisheries.*

What strikes one, interested in the study of ichthyology, in a perusal of this exhaustive work is its detailed analysis. The author has produced an elaborate monograph of a hitherto very much involved group of fresh-water fishes.

After comparing the systematic arrangements of the Coregonids of Cope, Gill, Regan, and Jordan and Evermann, he divides the whitefishes and ciscoes into three distinct genera, viz.: Leucichthys, Coregonus, and Prosopium.

In his diagnosis "measurements of some 10,000 specimens from many localities" were made; besides which hundreds of thousands of other specimens were cursorily examined. The author himself alone can adequately know what this task must have been.

There are some interesting things brought to light concerning similar effects upon different species indigenous to different habitats, and in respect of this he has given great attention to "variability of individual characters".

This admirable work pursues a uniform plan throughout, and is a valuable contribution, on a special subject, to ichthyological knowledge.

The work is replete in data and with facts, and is supplied with maps, beautiful figures of coregonids, also outlines of that group of fishes, and appended to the work are 101 elaborately worked out tables; and also appended is a comprehensive bibliography.—ANDREW HALKETT.

OFFICIAL CANADIAN RECORD OF BIRD-BANDING RETURNS

Published by authority of the National Parks of Canada Branch, Department of the Interior, Canada

In the following returns upon banded birds it will be noted that some returns may be thought to indicate, from the date of capture, violations of the Migratory Bird Act of Canada or the United States. The great majority of returns, which seem to indicate violations, are from birds accidentally caught in traps set for fur-bearing mammals, from birds caught in fish nets, killed by oil or from birds found dead from unknown causes. Appropriate action has been taken in connection with the few returns which indicate illegal shooting.

RETURNS UPON BIRDS BANDED IN 1923

GANNET, No. 296,585, yg., banded by William M. Duval, at Bonaventure Island, Quebec, on September 24, 1923, was found dead on the beach at the mouth of the Moisie River, Quebec, on September 3, 1928.

BLACK DUCK, No. 296,188, banded by H. S. Osler, at Lake Scugog, Ontario, on September 17, 1923, was killed at a place eight miles above Rock Point, Wicomico River, Maryland, on November 20, 1928.

RETURNS UPON BIRDS BANDED IN 1924

FERRUGINOUS ROUGH-LEGGED HAWK, No. 235, 808, fledgeling, banded by C. M. Sternberg, at Morrin, Red Deer River, Alberta, on June 24, 1924, was killed at a place twenty-two and one-half miles southwest of Garden City, Kansas, on November 7, 1928.

RETURNS UPON BIRDS BANDED IN 1925

MALLARD, No. 300,596, banded by T. E. Musselman, at Scobey Lake, Missouri, on March 28, 1925, was shot at Portage Country Club, seventy miles northwest of Winnipeg, on the marshes of Lake Manitoba, Manitoba, on October 12, 1928.

BLACK DUCK, No. 389,361, banded by H. S. Osler, at Lake Scugog, Ontario, on October 7, 1925, was killed on the Hongo River, Dorchester County, Maryland, on November 17, 1928.

RETURNS UPON BIRDS BANDED IN 1926

GREAT BLACK-BACKED GULL, No. 418,-754, juv., banded by Harrison F. Lewis, at Boat Islands, Saguenay County, Quebec, on August 6, 1926, was killed at Port-aux-Choix, Newfoundland, on October 26, 1928.

GREAT BLACK-BACKED GULL, No. 418,-772, juv., banded by Harrison F. Lewis, at Boat Islands, Saguenay County, Quebec, on August 7, 1926, was killed at Square Lake, New Brunswick, on November 13, 1928.

HERRING GULL, No. 421,593, banded by H. S. Shaw, at Cove Island, between Bar Harbour and Jonesport, Maine, on July 26, 1926, was found dead at Ste. Adelaide de Pabos, Gaspé County, Quebec,—reported on September 21, 1928.

FRANKLIN'S GULL, No. 450,338, yg., banded by William Rowan, at Francis Point, Beaverhills Lake, Alberta, on July 10, 1926, is thought to have been picked up dead, in the same locality, on July 10, 1926. The band was removed from this bird and later placed on a Mallard.

MALLARD, No. 418,369, banded by J. Broeker, at Portage des Sioux, Missouri, on March 2, 1926, was shot at Okla, Saskatchewan, on November 5, 1928.

MALLARD, No. 322,959, 1 year, male, banded by Bert Lloyd, at Davidson, Saskatchewan, on April 3, 1926, was shot at Belle Fourche, South Dakota, on October 31, 1928.

MALLARD, No. 388,571, female, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on August 26, 1926, was killed near Fontana, Miami County, Kansas, on November 3, 1928.

MALLARD, No. 456,284, banded by F. H. Rose, at Moiese, Montana, on October 24, 1926, was shot at a place twenty miles northeast of Hussar, Alberta, on October 4, 1928.

BLACK DUCK, No. 419,027, banded by Chas. R. Weinberger, at Hempstead, Long Island, New York, on July 11, 1926, was shot at a place nine miles from St. Andrews-by-the-Sea, New Brunswick, on November 1, 1928.

BLACK DUCK, No. 464,225, banded by H. S. Osler, at Lake Scugog, Ontario, on October 18, 1926, was shot at Pine Island Club, Poplar Branch, North Carolina, on November 15, 1928.

PINTAIL, No. 380,169, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on November 17, 1926, was shot at Weyburn, Saskatchewan, on October 20, 1928.

LESSER SCAUP DUCK, No. 464,457, banded by H. S. Osler, at Lake Scugog, Ontario, on November 8, 1926, was shot at Starbuck, Manitoba, on October 25, 1928.

RETURNS UPON BIRDS BANDED IN 1927

GREAT BLACK-BACKED GULL, No. 302,-712, juv., banded by Harrison F. Lewis, at Wapitagun, Saguenay County, Quebec, on July 30, 1927, was shot at Margaree, Newfoundland, on October 16, 1928.

HERRING GULL, No. 564,055, banded by William I. Lyon, at Hat Island, Green Bay, Wisconsin, on July 4, 1927, was found dead at Lake Huron, on the south side of Manitoulin Island, Ontario,—reported on October 21, 1928.

CALIFORNIA GULL, No. 544,053, yg., banded by Frank L. Farley, at Gull Island, in Bittern Lake, twelve miles west of Camrose, Alberta, on June 21, 1927, was found dead at Lake De Smet, Johnson County, Wyoming, on October 27, 1928.

CALIFORNIA GULL, No. 544,120, yg., banded by Frank L. Farley, at Gull Island in Bittern Lake, twelve miles west of Camrose, Alberta, on June 21, 1927, was found at a place twenty miles

southwest of Laramie, Wyoming, on October 15, 1928. The bird had a broken wing.

CALIFORNIA GULL, No. 554,713, banded by Frank L. Farley, at Bittern Lake, twelve miles west of Camrose, Alberta, during the month of July, 1927, was probably shot at a place five miles northwest of Fairfield, Montana, on October 24, 1928.

MALLARD, No. 300,740, banded by T. E. Musselman, at Lima Lake, near Meyer, Illinois, on March 13, 1927, was shot at Biggar, Saskatchewan, on October 19, 1928.

MALLARD, No. 418,379, banded by John Broeker, at Portage des Sioux, Missouri, on March 19, 1927, was killed at Fertile, Saskatchewan, on October 15, 1928.

MALLARD, No. 602,996, banded by F. H. Rose, at Moiese, Montana, on October 6, 1927, was shot at Beaver Lake, Alberta, on October 7, 1928.

MALLARD, No. 421,901, ad., f., banded by D. H. Bendick, at Leduc, Alberta, on October 12, 1927, was shot at a place nine and one-half miles from Leduc, Alberta, on October 3, 1928. This bird was reared by Mr. Bendick.

MALLARD, No. 594,176, banded by F. H. Rose, at Moiese, Montana, on November 1, 1927, was shot at Bracken, Saskatchewan, on September 26, 1928.

MALLARD, No. 594,196, banded by F. H. Rose, at Moiese, Montana, on November 1, 1927, was shot at Pine Lake, Alberta, on October 28, 1928.

MALLARD, No. 594,570, banded by F. H. Rose, at Moiese, Montana, on November 5, 1927, was shot at a place six miles northwest of Grande Prairie, Alberta, on October 1, 1928.

MALLARD, No. 594,833, banded by F. H. Rose, at Moiese, Montana, on November 7, 1927, was shot at Wynndel, British Columbia, on October 25, 1928.

MALLARD, No. 594,910, banded by F. H. Rose, at Moiese, Montana, on November 7, 1927, was shot at Coronation, Alberta, on October 15, 1928.

MALLARD, No. 594,924, banded by F. H. Rose, at Moiese, Montana, on November 7, 1927, was shot at Island Lake, seventy miles west of Edmonton, Alberta, on September 22, 1928.

MALLARD, No. 594,935, banded by F. H. Rose, at Moiese, Montana, on November 7, 1927, was shot at a place twelve miles east of Wetaskiwin, Alberta, on October 27, 1928.

MALLARD, No. 595,840, banded by F. H. Rose, at Moiese, Montana, on November 11, 1927, was shot at Twin Butte, Alberta, on October 25, 1928.

MALLARD, No. 595,603, banded by F. H. Rose, at Moiese, Montana, on November 12, 1927, was shot at Cardston, Alberta, on October 25, 1928.

MALLARD, No. 595,729, banded by F. H. Rose, at Moiese, Montana, on November 13, 1927, was shot at Red Deer, Alberta, on September 18, 1928.

MALLARD, No. 595,749, banded by F. H. Rose, at Moiese, Montana, on November 13, 1927, was shot at a place near New Dayton, Alberta, on September 17, 1928.

MALLARD, No. 595,926, banded by F. H. Rose, at Moiese, Montana, on November 13, 1927, was probably shot at Slocan City, British Columbia, on October 21, 1928.

MALLARD, No. 595,969, banded by F. H. Rose, at Moiese, Montana, on November 13, 1927, was shot at Oyen, Alberta, on November 9, 1928.

MALLARD, No. 557,591, banded by W. B. Large, at Rochester, New York, on November 17, 1927, was shot at a place six miles east of Plum Lake, Manitoba, on October 26, 1928.

MALLARD, No. 597,144, banded by F. H. Rose, at Moiese, Montana, on November 25, 1927, was shot in southern Alberta, near the Montana boundary, on October 6, 1928.

MALLARD, No. 465,968, m., banded by R. H. Bruce, at Rockwood Park Sanctuary, Saint John, New Brunswick, on November 28, 1927, was shot on the Hampton Marshes, about twenty miles from Saint John, New Brunswick,—reported on September 26, 1928.

BLACK DUCK, No. 557,490, banded by W. B. Large, at Rochester, New York, on November 14, 1927, was killed at Bondfield, Ontario, on September 17, 1928.

BLACK DUCK, No. 596,660, banded by W. B. Large, at Rochester, New York, on November 24, 1927, was shot at the mouth of the Attawapiskat River, James Bay, Ontario,—reported on August 15, 1928.

RETURNS UPON BIRDS BANDED IN 1928

HORNED GREBE, No. 455,341, yg., banded by T. E. Randall, at Forestburg, Alberta, on July 27, 1928, was shot at Ladner, British Columbia, on October 15, 1928. The bird was thought to be a teal.

BLACK GUILLEMOT, No. 560,258, banded by O. L. Austin, at a place fifteen miles southeast of Ford's Harbor, Newfoundland Labrador, on August 9, 1928, was shot at Godbout, Saguenay County, Quebec, on November 12, 1928.

GREAT BLACK-BACKED GULL, No. 660,-481, juv., banded by E. H. Fletcher, at St. Mary Islands, Canadian Labrador, Quebec, on July 20, 1928, was captued at Boudreauville, Nova Scotia, on October 7, 1928.

GREAT BLACK-BACKED GULL, No. 660,-484, juv., banded by Edmund H. Fletcher, at St. Mary Islands Sanctuary, Canadian Labrador, Quebec, on July 20, 1928, was caught by a fisherman at Piller's Bight, Newfoundland, on September 19, 1928.

GREAT BLACK-BACKED GULL, No. 662,-723, imm., banded by Basil Colbran, at Lake George, Yarmouth County, Nova Scotia, on July 23, 1928, was found on the shore of St. Mary's Bay, Nova Scotia, on November 3, 1928.

HERRING GULL, No. 703,028, banded by Harold C. Wilson, at Hat Island, Wisconsin, on June 30, 1928, was shot at Kingston, Ontario, on October 17, 1928.

HERRING GULL, No. 554,372, yg., banded by A. D. Trempe, at Courts Point, Two Tree River, St. Joseph Island, Ontario, on July 1, 1928, was found dead on Two Tree Island, Munuscong Lake, St. Mary's River, Michigan, on July 19, 1928.

HERRING GULL, No. 707,854, banded by William I. Lyon, at Taquamenon Island, Chippewa County, Michigan, on July 9, 1928, was

caught at McDiarmid, Ontario,—reported on October 31, 1928.

HERRING GULL, No. 657,238, juv., banded by Edmund H. Fletcher, at St. Mary Islands Sanctuary, Canadian Labrador, Quebec, on July 20, 1928, was shot at a place near Rose Blanche, Newfoundland, on October 14, 1928.

HERRING GULL, No. 657,269, juv., banded by Edmund H. Fletcher, at St. Mary Islands, Canadian Labrador, Quebec, on July 20, 1928, was caught at Griguet, Newfoundland, on September 11, 1928.

HERRING GULL, No. 657,294, juv., banded by Edmund H. Fletcher, at St. Mary Islands, Canadian Labrador, Quebec, on July 20, 1928, was captured at Spotted Islands, Newfoundland Labrador, on September 8, 1928.

CALIFORNIA GULL, No. 699,123, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 23, 1928, was shot at Watsonville, California, on November 4, 1928.

CALIFORNIA GULL, No. 699,628, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was killed at Frazer Lake, near Frazer, Valley County, Montana, on October 21, 1928.

CALIFORNIA GULL, No. 699,680, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot at Cananea, Sonora, Mexico, on October 21, 1928.

CALIFORNIA GULL, No. 699,789, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot at Sucker Creek, Alberta, on October 12, 1928.

CALIFORNIA GULL, No. 699,807, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteeen miles northwest of Camrose, Alberta, on June 28, 1928, was found dead at a place about two and three-quarter miles north of Barons, Alberta, on August 23, 1928.

CALIFORNIA GULL, No. 699,811, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was killed at Kaleland, Alberta, on October 3, 1928.

CALIFORNIA GULL, No. 699,818, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot on Lesser Slave Lake, Township 74, Range 14, west of the fifth meridian, Alberta, on August 19, 1928.

CALIFORNIA GULL, No. 699,826, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot at a place twenty miles southeast of Calgary, Alberta, on September 15, 1928.

CALIFORNIA GULL, No. 699,836, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot on the shore of a pond, on August 12, 1928,—reported by a resident of Claresholm, Alberta.

CALIFORNIA GULL, No. 699,866, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was found dead at Cadogan, Alberta, on August 15, 1928.

CALIFORNIA GULL, No. 699,874, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was shot on Lesser Slave Lake, near St. Brunos, Mission, Alberta, on September 15, 1928.

CALIFORNIA GULL, No. 699,908, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was found injured, at Bow River, East Calgary, Alberta, on September 20, 1928. The bird died at the premises of a Humane Society, shortly after it was found.

CALIFORNIA GULL, No. 699,972, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was caught in a trap and released unharmed at a place eighty-five miles southeast of Edmonton, Alberta, on September 15, 1928.

CALIFORNIA GULL, No. 699,992, juv., banded by Frank L. Farley, at Gull Island, north end of Bittern Lake, fifteen miles northwest of Camrose, Alberta, on June 28, 1928, was found in the Saskatchewan River, Clover Bar, Alberta,—reported on August 15, 1928. The bird had been shot.

CASPIAN TERN, No. 497,224, juv., banded by Harrison F. Lewis, at Fog Island, Saguenay County, Quebec, on August 9, 1928, was found dead at Monteo, North Carolina, on October 6, 1928.

COMMON TERN, No. 361,323, imm., banded by E. Beaupre, at Kingston, Ontario, on July 8, 1928, was found dead in the same locality, on August 12, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,760, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was received from a local hunter for the Kansas City Zoo, Kansas City, Missouri, on October 13, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,774, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was killed at Pinebur, Mississippi, on October 8, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,785, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was shot at Hills Lake, ten miles east of North Little Rock, Arkansas, on November 12, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,789, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was found dead on the Canadian River, thirty miles north of Pampa, Texas, on November 4, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,795, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchwan, on July 21, 1928, was shot at Lake Lillian, Minnesota, on October 13, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,801, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July

21, 1928, was recovered at Watertown, South Dakota, on September 22, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,816, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was shot at Hildebrand Pass, eight miles north of Waubay, South Dakota, on October 14, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,818, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was killed at Lake Manawa, Council Bluffs, Iowa, on September 23, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,824, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was found crippled on the shore of Lake Minnewashte, South Dakota, on September 26, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,834, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was killed at a place two miles south of Griswold, Iowa, on November 2, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,843, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was shot at a place twenty-five miles southwest of Joliet, Illinois, on September 22, 1928.

DOUBLE-CRESTED CORMORANT, No. 303,850, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was picked up wounded, at Iowa Lake, Minnesota, on November 12, 1928. The bird died later.

DOUBLE-CRESTED CORMORANT, No. 466,901, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was recovered. in a badly wounded and exhausted condition, at Oskaloosa, Iowa, on October 10, 1928.

DOUBLE-CRESTED CORMORANT, No. 466,916, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was shot at Lima Lake, twenty miles north of Quincy, Illinois, on September 30, 1928.

DOUBLE-CRESTED CORMORANT, No. 466,940, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was taken on the Maumee River, near Grand Rapids, Ohio,—reported on October 25, 1928.

DOUBLE-CRESTED CORMORANT, No. 466,947, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was killed at Lacon, Illinois, on September 19, 1928.

DOUBLE-CRESTED CORMORANT, No. 466,951, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was shot at Swan Lake, Nicollet County, Minnesota, on October 11, 1928.

DOUBLE-CRESTED CORMORANT, No. 466,961, banded by Bert Lloyd, at the north end of Last Mountian Lake, Saskatchewan, on July 21, 1928, was found at Lake Byron, South Dakota, on November 11, 1928.

DOUBLE-CRESTED CORMORANT, No. 466,964, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was killed at Rexmere, Louisiana, on October 15, 1928.

DOUBLE-CRESTED CORMORANT, No. 466,988, banded by Bert Lloyd, at the north end of Last Mountain Lake, Saskatchewan, on July 21, 1928, was shot at Maple Lake, Mucker County, Minnesota, on October 22, 1928.

DOUBLE-CRESTED CORMORANT, No. 302,532, juv., banded by Harrison F. Lewis, on Egg Rock, Cape Whittle Sanctuary, Saguenay County, Quebec, on August 4, 1928, was shot at Nahant, Massachusetts, on October 12, 1928.

MALLARD, No. 557,934, m., banded by Frank Hopkins, at Moon Lake, Campbellsport, Wisconsin, on May 17, 1928, was shot at Clandeboye Marsh, about thirty miles north of Winnipeg, Manitoba, on October 14, 1928.

MALLARD, No. 557,019, ad. f., banded by Bert Lloyd, at Davidson, Saskatchewan, on June 23, 1928, was killed at Truman, Arkansas, on November 14, 1928.

MALLARD, No. 455,238, juv., banded by Archie Hull, at Flat Lake, Alberta, on July 4, 1928, was shot in Chambers County, Texas, on November 1, 1928.

MALLARD, No. 557,023, part albino—black and white, banded by Bert Lloyd, at Davidson, Saskatchewan, on July 21, 1928, was shot at Missouri River, Missouri Valley, Iowa, on November 7, 1928.

MALLARD, No. 557,040, banded by Bert Lloyd, at Davidson, Saskatchewan, on July 21, 1928, was shot at a place five miles north of Bladworth, Saskatchewan, on October 10, 1928.

MALLARD, No. 557,044, part albino—black and white, banded by Bert Lloyd, at Davidson, Saskatchewan, on July 21, 1928, was shot at Osakis, Minnesota, on November 15, 1928.

MALLARD, No. 557,056, pure white albino, banded by Bert Lloyd, at Davidson, Saskatchewan on July 21, 1928, was shot at Bengough, Saskatchewan, on October 31, 1928.

MALLARD, No. 557,074, banded by Bert Lloyd, at Davidson, Saskatchewan, on July 21, 1928, was recovered at Orient, Iowa, on November 7, 1928.

MALLARD, No. 557,076, banded by Bert Lloyd, at Davidson, Saskatchewan, on July 21, 1928, was shot at a place about ten miles west of Nokomis, Saskatchewan, on October 6, 1928.

MALLARD, No. 557,093, banded by Bert Lloyd, at Davidson, Saskatchewan, on July 21, 1928, was shot at Osakis, Minnesota, on November 15, 1928.

MALLARD, No. 388,596, juv., banded by Paul E. Page, at Lac Ste. Anne, Alberta, on August 17, 1928, was killed at Kaskaskia River, about three miles south of Vandalia, Illinois, on October 25, 1928.

MALLARD, No. 388,597, juv., banded by Paul E. Page, at Lac Ste. Anne, Alberta, on August 17, 1928, was shot at a place four miles east of Westlock, Alberta, on Septembre 29, 1928.

MALLARD, No. 388,607, juv., f., banded by Paul E. Page, at Lac Ste. Anne, Alberta, on August 20, 1928, was shot in the same locality, on September 22, 1928.

MALLARD, No. 388,610, f., banded by Paul E. Page, at Lac Ste. Anne, Alberta, on August

20, 1928, was shot at Eagleton, Montana, on November 2, 1928.

MALLARD, No. 388,637, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on September 2, 1928, was shot in the same locality, on October 1, 1928.

MALLARD, No. 388,638, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on September 2, 1928, was shot at a place two and one-half miles southeast of Wayland, Missouri, on November 2, 1928.

MALLARD, No. 388,642, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on September 3, 1928, was killed at a place twenty-five miles southeast of DeWitt, Arkansas, on November 11, 1928.

MALLARD, No. 388,650, banded by Paul E. Page, at Lac Ste. Anne, Alberta, on September 14, 1928, was shot at a place four miles east of Pratt, Kansas, on November 5, 1928.

MALLARD, No. 557,119, m., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 15, 1928, was shot in St. Charles County, Missouri, on October 27, 1928.

MALLARD, No. 557,122, f., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 15, 1928, was shot at Bladworth, Saskatchewan, on October 18, 1928.

MALLARD, No. 557,123, banded by Bert Lloyd, at Davidson, Saskatchewan, on October 15, 1928, was shot at Last Mountain Lake, Saskatchewan, nine miles west of Duval, on November 2, 1928.

MALLARD, No. A615,672, banded by F. H. Rose, at Moiese, Montana, on October 15, 1928, was shot at a place twenty miles west of Cardston, Alberta, on October 18, 1928.

MALLARD, No. 557,153, f., banded by Bert Lloyd, at Davidson, Saskatchewan, on October 17, 1928, was shot at a place thirty-five miles northwest of Sioux City, Iowa, on November 2, 1928.

BLACK DUCK, No. 596,729, f., banded by W. Bruce Large, at Durand Eastman Park, Rochester, New York, on March 14, 1928, was killed at James Bay, Ontario, during the spring of 1928.

BLACK DUCK, No. 422,594, imm., banded by R. W. Tufts, at Pokemouche, Gloucester County, New Brunswick, on July 9, 1928, was found dead at a place near the Caraquet North River, Gloucester County, New Brunswick, on October 13, 1928.

BLACK DUCK, No. 540,375, juv., m., banded by K. Christofferson, at Dodge Brothers Munuskong State Park, Pickford, Michigan, on September 4, 1928, was shot on St. Marie's River, Ontario, near Neebish Island, about twenty-two miles from the city of Sault Ste. Marie, Ontario, between Sugar Island, Michigan, and the Mainland of the District of Algoma,—reported on September 11, 1928.

BLACK DUCK, No. 596,792, banded by W. B. Large, at Rochester, New York, on September 16, 1928, was shot at Riviere Beaudet, Quebec, on October 22, 1298.

BLACK DUCK, No. 596,852, banded by W. B. Large, at Rochester, New York, on October 9, 1928, was shot at the Bay of Quinte, Prince Edward County, Ontario, on November 6, 1928.

BALDPATE, No. 601,616, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on January 17, 1928, was shot at De Bolt, Alberta, on October 13, 1928.

SHOVELLER, No. 532,404, banded by Bert Lloyd, at Davidson, Saskatchewan, on October 1, 1928, was killed at Muskrat Lake, south of St. Joe, Missouri, on November 3, 1928.

PINTAIL, No. 601,849, banded by E. W. Ehmann, at Lake Merritt, Oakland, California, on January 17, 1928, was shot at Richdale, Alberta, on October 13, 1928.

PINTAIL, No. 389,906, banded by Frank Robl, at Ellinwood, Kansas, on February 11, 1928, was shot at Calgary, Alberta, on September 20, 1928.

PINTAIL, No. 455,311, yg., banded by T. E. Randall, at Forestburg, Alberta, on July 24, 1928, was shot in Ottawa County, Ohio, on October 9, 1928.

PINTAIL, No. 455,313, yg., banded by T. E. Randall, at Forestburg, Alberta, on July 24, 1928, was killed at a place ten miles south of Miami, Texas, on October 21, 1928.

PINTAIL, No. 455,357, yg., banded by T. E. Randall, at Forestburg, Alberta, on July 27, 1928, was killed at Lott, Texas, on October 18, 1928.

PINTAIL, No. 557,150, banded by Bert Lloyd, at Davidson, Saskatchewan, on October 17, 1928, was killed at Sweetwater, Texas, on November 5, 1928.

NIGHTHAWK, No. 260,878, juv., banded by A. Burton Gresham, at Winnipeg, Manitoba, on August 9, 1928, was found dead in the same locality, on August 11, 1928.

HOUSE WREN, No. B35,826, yg., banded by R. H. Carter, Jr., at Muscow, Saskatchewan, on July 20, 1928, was found dead in the nest on August 4, 1928.

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CONTENTS

	PAGE
Sage Grouse in Saskatchewan. By F. Bradshaw	197
Glimpses of Little-known Western Lakes and Their Bird Life. By J. A. Munro (*Continued*)	200
A Pleistocene Fauna from British Columbia. By C. H. Crickmay	205
Notes and Observations:—	
The Great Horned Owl is Beneficial. By Ralph D. Bird	206
Golden-crowned Kinglets Breeding in the Ottawa District. By D. H. Baker	207
Note on the White Lipped Shrew and Other Species in the Parry Sound District. By W. E. Saunders	207
Dowitcher in Middlesex County, Ont. By W. E. Saunders	208
Sea Otter Increasing	208
Correspondence	209
Index to Vol. XLIII	213

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SAGE GROUSE IN SASKATCHEWAN

By F. BRADSHAW

THE field staff of the provincial museum established its camp during the months of May and June on the banks of the Frenchman river, a tributary of the Missouri, about twelve miles north-west of the village of Val Marie in the south west corner of Saskatchewan. The principal reason for locating here was to study the status of the Sage Grouse and secure, if possible, specimens of birds and eggs for a museum group, and, incidently, to make a collection of the more common varieties of birds and mammals to be used as study skins for educational purposes.

The Frenchman river, in the vicinity of the camp, was about six feet deep, twenty feet wide, and the banks would average about ten feet high. The water is of a white mud colour and was flowing fairly rapidly at the time of our visit. I was informed that it overflows its banks in the spring and sometimes dries up in places during the summer. Willows and rose bushes border the river, and sage bush flats extend for about a mile on either side to the foot of the hills. The sage bush grows luxuriantly nearest the river, the branches being thick, strong and vigorous. Toward the base of the hills the bushes are more sparsely distributed and dwarfed. A few isolated bushes are found in the coulees and on top of the hills.

It was in these flats we started our quest for the Sage Grouse on May 18th, 1929. Not having encountered this somewhat rare bird in life we were lacking in experience as to its habits, but information gleaned from the records of other observers led us to believe we were in suitable ground, and that it would be merely a matter of a few hours before we would find our quarry, for the local ranchers had assured us that the birds were there. My companion, F. G. Bard, and I, searched systematically and diligently one large area east of camp, examining in the course of the day thousands of sage bushes where we were ever expectant of finding a nest or the birds, but no sign of either was seen. The following day we renewed our search west of the camp with no better results. Returning to camp on the third day, a little discouraged by our fruitless search, my companion, who was driving the car, remarked, somewhat disconsolately, "I'll be surprised if I ever see a sage hen in this desert-looking country." While he was thus expressing his disappointment I caught sight of what I imagined might be a specimen of our evasive quarry. I commanded, somewhat doubtfully, but still hopefully, "stop the car, Fred, and I'll show you one." What looked to me as much like a broken branch of a sage brush as anything else after all turned out to be the head and neck of a real live sage hen. It was not more than thirty yards away and when we stepped out of the car to make sure we were not being deluded seven other birds, well within this distance, seemed to come from nowhere and calmly looked at us or started leisurely to walk away in stately fashion. After this fortunate introduction to the "Cock-of-the-Plains", as it is sometimes called, our subsequent searches were always rewarded by many opportunities to study this bird at close range in its home surroundings.

We had evidently made the mistake of looking over the heavy growth sage-brush, whereas the birds found were usually in the small widely scattered clumps that had been closely cropped by stock. One might think such thin cover would not suffice to hide this largest of the American grouse family, the male species of which is thirty inches in length, and from five to eight pounds in weight, but when squatting near these bushes on the brown earth with little or no grass to speak of, the color of the bird so nearly harmonizes with the surroundings that one has almost to step on the birds before one is aware of their presence. I never did get over the surprise occasioned by the appearance of these birds in such unlikely cover even when I knew they were hiding nearby. Time and time again they would be "frozen" at the base of some short bush unnoticed until they rose and walked quietly away.

We found that with the car we could approach within fifteen yards of the grouse without disturbing them. My last day in the camp I started out alone, allowing the car to take its own course

in low gear at two miles per hour while I scrutinized the bushes as I passed by. Seeing what I thought might be a likely looking place for a nest I stopped the car. As soon as I stepped out I shared Dr. W. T. Hornaday's first experience back in the days when Sage Grouse were plentiful in the United States. A flock of twenty-five "exploded close in front of me, and leaped into the air, I was scared by the thunder of it, and dazed by the size and beauty of the birds. As they flew away from me, their big heavy bodies rocked from side to side like a boat in a rolling sea."

The protective coloration afforded the birds when crouched low upon the ground in the shelter of the sage brush is greatly minimized when the birds assume a standing position. It is then no difficulty to see the birds one half mile away with the aid of field glasses, more especially the males, whose white neck feathers protrude and look like a snow white ribbon ruff even as the birds walk straight away from the observer. The females are much smaller than the males, averaging twenty-two inches in length. Of the thirty birds observed twenty-five were males. Possibly, other females may have been nesting, but in view of our extensive search for nests I am inclined to the opinion that we saw practically all the birds in the immediate vicinity.

The feathers of the lower neck and upper breast of the male birds secured for the museum are short, worn and frayed, giving them a stiff spiny appearance. The condition is apparently accounted for by the behaviour of the birds during the mating season. Mr. Frank Bond, writing in *The Auk* sometime ago, gives some very interesting information on this subject. 'The peculiar feathers of the breast of the Sage Cock" he says, "are more or less faithfully described by every ornithologist who has published a sketch of the bird; but as yet I have seen no explanation of the cause of the wearing away of the barbs and even shafts of the feathers of the lower neck. These feathers are worn away during that period of sexual excitement which causes many birds to develop odd and eccentric habits until the nuptial season is passed. The Sage Cock is unable to produce the musical booming sound of the Prairie Chicken, the forcible expulsion of the air from the sacks producing an inconsequential chuckling noise only; nevertheless the bird offers reasonable entertainment to any individual who will rise early and stroll out into the sagebrush a hundred yards from the campfire.

"During the months of April and May the Sage Cocks are usually found in small flocks of a half dozen or more, stalking about with the tails erect and spread after the manner of the strutting Turkey-cock, but I have never seen the Grouse dragging their wings upon the ground, Turkey fashion, and in the manner described by Dr. Newberry in the quotation from this author found on page 406 of Dr. Coue's 'Birds of the Northwest'; nor have I ever found a wing of a Sage Cock, in this or any other season, which exhibited the slightest wearing of the primaries.

"Instead of dragging its wings upon the ground the excited Sage Cock will enormously inflate the air-sacs of the neck until the whole neck and breast is balloon-like in appearance, then, stooping forward, almost the entire weight of the body is thrown upon the distended portion and the bird slides along on the bare ground or short grass for some distance, the performance being concluded by the expulsion of the air from the sacks with a variety of chuckling, cackling or rumbling sounds. The performance is continued probably daily, during the pairing and nesting season, and of course the feathers are worn away by the constant friction."

The throat and air sacs of the males were covered with a liver-coloured mass of a watery flesh consistency, which was difficult to dislodge in the process of skinning. This no doubt accounts for the flabby gait of the males during the breeding season. This condition was scarcely apparent in the females and I understand is almost negligible in the males taken in the fall.

The Sage Grouse differs from other members of the grouse family, having no muscular grinding gizzard, but merely a membraneous stomach which some claim is incapable of digesting grain, although others maintain that occasionally birds have been taken whose stomachs were full of wheat. Its principal diet, however, would appear to be the leaves of the sage brush, and all stomachs of adult birds examined by us contained no trace of other food. The stomach contents of a young chick comprised many varieties of insects with just a trace of sage brush leaves.

We had not much definite information to work upon regarding the nesting period of the Sage Grouse. Two eggs in the museum were recorded as being taken on June 24, 1914. Macoun reports finding a nest of Chicks emerging from the shell on June 21, 1895, from which nest two nearly perfect eggs were taken. The abdomen of each of the females examined by us was mostly bare of feathers, and we assumed they were nesting birds, although I am not at all convinced on this point. In seeking information from two local ranchers who had been riding the habitat of the sage grouse for more than twenty years I was surprised to learn they had never found a nest. With such meagre information to work upon we

started to look for nests from the first day we camped, May 18th. On our way in to camp we stopped for a chat with Mr. Peter Gouez who was ploughing up the sage brush flats on his farm with a tractor. We acquainted him with our mission and he told us that on two or three occasions during recent years he had found the nest of the sage grouse but did not remember the dates. He also stated that only that morning he had seen a pair of birds around his shack on the top of the hill. In view of this encouraging information we started work on Pete's place but as already intimated without success. We told Pete that if by any chance he should run across a nest to let us know so that we could take a photograph of it and secure the eggs for our proposed museum group.

For six days we continued our search but no nest was found. On May 24th as we were passing Pete's place he hailed us and conveyed the delightful information that when ploughing the last furrow the previous night he flushed a sage grouse and found a nest of seven eggs. We were hoping against hope that he had not made a mistake in his identification and asked him where they were. He said they were on the table at his shack and told us to go and get them. The nesting material which comprised a small handful of grass and a few feathers he had thrown outside. Pete turned out to be a very reliable informant, his statements, without exaggeration, checking up in every detail, which experience is an exception to the rule.

After securing our prize we returned to Pete in the hope that he might be able to direct us to the nesting site, so that we could replace the nest and eggs and take a photograph. Unfortunately, he had just ploughed under the actual site that morning, so he did the next best thing by selecting a similar bush where he scooped out a saucer sized hole in which we placed the scanty nesting material and eggs and secured an excellent photograph. It is worthy of note that Pete's place is about five miles east of our camp location and that in this area we saw no birds, while west of the camp we saw many birds but no nests during a three weeks' search.

Much as we were delighted in securing this nest we were naturally very desirous of finding one for ourselves. I left camp on June 1st, but Mr. Bard remained to continue the search. On June 6th while trying to locate the nest of a lark bunting he stumbled across what he thought was the dead body of a sage grouse with its head severed. He bent forward to pick it up and actually touched it when he was somewhat startled to find the "dead" bird sailing away between his legs. What he really saw was the protuding tail of a sage hen which had a nest of eleven eggs just inside a heavy growth sage brush. He had walked around this bush a score of times during an hour's search for the lark bunting's nest without being aware of the presence of the sage hen, which once more demonstrates the ability of this bird to evade detection

The material found in this nest was the same as that in the nest previously referred to, but of more bulky proportions. The eggs are quite large—2.15 x 1.50—with a greenish drab ground covered with rounded dots and spots of reddish brown. There is a wide variation in the markings of the eggs from the same set. Some eggs being fairly thickly covered with dots while others have little more than pin-head spots. One writer states that "these markings are all superficial and can be easily wiped off, leaving the egg a uniform greenish white". I could make no erasure by rubbing vigourously with a moist cloth, but with the aid of the finger nail under the moist cloth the spots could be scratched off. This set of eggs was very heavily incubated while the first set taken were fresh, leading us to suppose that the average nesting season would be about the latter half of May and the first half of June.

A flock of four young and another of ten were seen by Mr. Bard on June 20th, all of which were able to fly. They scattered as they flew away and he marked down one bird which he followed up and found "frozen" near a sage bush.

"As Bamboo to the oriental, or as the Cocoanut Palm to the South Sea Islanders, so is the sage brush to the Cock-of-the-Plains," according to Mr. Wm. Leon Dawson, who states that "it not only provides him shelter of a sort, but food and probably drink as well". The Sage Grouse is a non-migratory bird and seems dependent upon the leaves of the sage brush for subsistence. The sage brush flats of the south west are rapidly being brought under cultivation, as instanced by the finding of our first nest by the ploughman. Extensive areas of former range of the Sage Grouse are now devoted to the growing of crops, and it seems but a matter of a very short time before the grouse will be hard put to it to find suitable areas in which to maintain its all too small population. Generally speaking, the present range of the Sage Grouse in Saskatchewan is confined to isolated sage brush territory from ranges one to twenty in townships one to five west of the third meridian, and principally along the Frenchman river and its tributary streams. It is unlawful to shoot Sage Grouse at any time, but in addition to the strict observance of the game laws it would seem that unless some means are taken to prevent further inroads on its breeding grounds, and unless the settlers who come in close contact with this bird

can be interested sufficiently to guard its future welfare, it will be but a question of time before this noble giant of the grouse family will be a thing of the past in this province.

GLIMPSES OF LITTLE-KNOWN WESTERN LAKES AND THEIR BIRD LIFE

By J. A. MUNRO

(*Continued from page 187*)

MINISTIK LAKE, ALBERTA.

MINISTIK, the lake of many islands, is one of a series of attractive lakes in Townships 50 and 51–21–W4. Residents recognize two lakes, the "Small Lake" and the "Main Lake". The western portion of both divisions, with deeply indented shore lines, contain so many islands, separated by such narrow channels, that a stranger is often at a loss to navigate the labyrinth; or to decide what constitutes the islands and what the mainland. Practically all the islands are timbered, some with poplar, birch and willow, others with large spruce in addition to the deciduous growth. The exceptions are merely sandbars or rock-reefs and many of those which high water submerge support a heavy growth of bog-rush and phragmites. The shores of the mainland are muddy for the most part and the decomposed vegetation forming the top layer gives forth a strong odour. The shores of the islands, on the other hand, are sandy or stony, some encircled with a growth of bog-rush, others free of aquatic vegetation.

The lake is shallow and the muddy, discoloured water, although apparently not alkaline, has a disagreeable, weedy taste. *Potamogeton pectinatus* grows luxuriantly in all the shallow portions as do other species of the water plants eaten by ducks. In certain aspects this tree-girt lake suggests some of the Northern Ontario summer resorts but the resemblance is only superficial—instead of clear, amber-coloured water here are weed-choked channels, and the sight of fluttering terns or soaring pelicans soon dispels the illusion.

Ducks of many species nest on the islands or along the marshy shores of the mainland and the lake serves also as a nursery for young ducks that have been hatched in the fields farther inland. Lesser Scaup and Canvas-back are the commonest diving-ducks and it is quite usual to find mixed broods of these two species. Pintail, Mallard, Baldpate, Shoveller and Blue-winged Teal are about equally represented. Amongst the diving-ducks late broods are the rule rather than the exception. In late August it is of everyday occurrence to find downies only a few days old and Mr. Kinnaird of Edmonton reports two Lesser Scaups incubating eggs on August 12th, 1923. Needless to say ducks hatched late in August in the Province of Alberta have little chance of joining the southern migration.

It is believed this state of affairs is due, in part at least, to the large number of crows. The mainland and islands are well wooded and provide the necessary secluded nesting sites where crows may breed in security, while their food problem in early summer is solved by the abundant supply of waterbirds' eggs. These are hunted systematically and persistently. During the past three years crow control work has been undertaken on a small scale and conditions have somewhat improved.

Crane island, familiar to all the local residents as a breeding ground for the Great Blue Heron, was first visited on August 17th, 1922, and at this date most of the estimated seventy nests were deserted. In possession were twelve full-grown young, standing motionless in weird attitudes on the bulky nests or in the spruces and birches which supported them. Below the nesting trees, some of which had recently died, broken egg-shells, skeletons of youngsters that had fallen from the nests, and other debris usual to such colonies was hidden by a rank growth of raspberries, jewel weed and nettles. A pair of Turkey Vultures accompanied by one young bird which had been raised on the island, two Western Tanagers, a flock of Siskins and several Hairy Woodpeckers also were noted in the thick timber.

On June 21st, 1924, the colony was estimated at fifty pairs. Some of the nesting trees had fallen and many others were dead or dying. A great commotion and the susurration of many beating wings filled the air as I approached the rookery through the tangled island vegetation while birds launched forth hurriedly from the trees, long legs dangling awkwardly in the first few moments of alarm. Some quickly settled again on the trees in the strained attitudes of watchfulness, ready to depart at the first hostile movement; others, less parentally solicitous, in powerful and leisurely flight, circled about the island high above the tree tops.

On another visit (August 6th, 1925) only three birds were left of the summer colony—a full-grown youngster standing on a nest, another flying over the island and the third on the lake shore, in

statuesque relief against a background of tall grasses.

A small stony, sand-encircled reef close to Crane Island is yearly occupied by a nesting colony of Common Terns—holding tenure perhaps with difficulty for the reef is a popular resting-place with other water-fowl. Pelicans find it to their liking, Canada Geese also, and in late August, after the young terns were flying, I have seen it crowded with Bonaparte's Gulls. Common Terns also colonize a similar reef two miles to the eastward. When visited on August 6th, 1925, it was crowded with migrant Franklin's Gulls and almost lost to view amongst them stood the Terns with their full-grown young. One Tern, in the great flock that left the reef upon the boat's approach, returned to hover over a particular spot exactly as do nesting parents in fluttering anxiety for their young; but a careful search revealed nothing save one old, broken egg-shell hidden amongst the stones. The reef was swept clean; of the Tern colony in solitary and jealous occupation only a few weeks before, no trace remained except the broken egg-shell.

Ministik is much favoured by Bonaparte's Gulls; immature birds are seen all through the summer, and in August, when adults and young are drifting south, often the lake is crowded with these lagging migrants—at times they seem to outnumber all other water-fowl. This gull has nested not more than seventy-five miles distant in an air-line to the north-west, and, since receiving a report several years ago of small gulls nesting in the spruce trees on a small island in Ministik Lake, there has been a hope, so far unfulfilled, of finding a nesting colony here.

Eared Grebe, Holboell's Grebe, Western Grebe, Bittern and Black Terns nest in the beds of bog rush and phragmites, while the more solitary and aggressive Loon selects some marsh-fringed point with an unobstructed view—one such situation has been occupied during three successive years. Lesser Yellowlegs, seen all through the summer, undoubtedly nest in the vicinity. Apart from this species, which is quite common during migrations, few waders visit the lake except Baird's, Least, Semipalmated and Solitary Sandpipers which appear regularly in small numbers.

The following notes are from my diary of August 6th, 1925; A cool, stormy morning. From the tree-tops on the island came the lisping warblers—unseen for the most part but Tennessee, Yellow and Black and White were identified. A greenish-backed bird that kept high in the spruces, and of which I obtained little more than a glimpse of the back and a dendroicine tail, might have been a Black-throated Green. Saskatoon bushes are loaded with fruit sweeter and better-flavoured than the Okanagan berry. To these came Robins, Flickers, Purple Finches, a Cowbird, a Song-sparrow, a Baltimore Oriole, and a Cedar Wax-wing with her brood of striped young. Crossbills alighted several times on the spruce tops, a Yellow-bellied Sapsucker silently worked over a dead birch and at the farthest corner of the island I flushed a full-grown brood of Ruffed Grouse that had been sampling the ripe bunch-berries, so vividly scarlet in their setting of brown Spruce needles.

In late afternoon I paddled to a number of the grassy islands in the north end of the lake. On one of these—really a bog-rush bed on a stony reef covered with a few inches of water—three old nests of Holboell's Grebe attracted attention. Beside one lay an addled egg and beside another three eggs floated amongst the rush stems. Adult Black Terns in winter plumage hovered over the rushes as they do in early summer over their nesting grounds but no signs of this particular marsh having been occupied were discovered. Bonapart's Gulls, floating high on the water with tails and wings held at a rakish angle, were dotted in every direction over the placid lake while Franklin's Gulls congregated on a narrow beach, bordered by tall grasses, on the north shore.

A female Buffle-head with three flying young allowed the canoe to approach within fifteen yards then burst from the water, and, slanting upward, circled the tree tops and dropped into the lagoon behind us. On several narrow, muddy points extending from a shore line of tall rushes fully grown broods of Blue-winged Teal and Mallard associated in small flocks. The one brood of White-winged Scoter noted still were in the down, so also were the majority of Canvas-back and Lesser Scaup.

To find eggs of two or more species of ducks in one nest is not uncommon on these prairie lakes and one wonders if, in the past, this has led to wrong identifications of downy young. To-day three broods of downy Lesser Scaup, amongst which swam several Canvas-back of the same age, passed along one of the lagoons. That these had been hatched together seemed probable, although the mixing of broods on this crowded lake is quite possible also.

SICKMAN LAKE, ALBERTA.

Sickman Lake, seven miles east of Vegreville, is surrounded by open rolling country, a considerable portion of which is under cultivation, the balance lightly timbered with clumps of poplar. The fore-shore at the water's edge is all open, hard, sandy beach; further back from the water

is a sparse growth of skunkgrass, potentillas, various species of asters, etc. There is no marsh in the lake or on the shores and apparently little duck-food of any description.

When I visited the lake on August 24th, 1922, it appeared quite low judging by the wide expanse of beach and I was told that the water was four feet or less in depth, which is much under normal. In the south end of the lake are several small grassy islands, the largest have a few low willows on the higher portions, the smaller ones are bare and probably submerged at high water.

Very few ducks were seen—a flock flew over my camp early in the morning headed for the lake and several small flocks were seen later in the day. One brood of half-grown Mallard were disturbed from the grass on the upper beach.

BAXTER LAKE, ALBERTA.

On October 2nd, 1922, I proceeded by car from Wainwright to Baxter Lake, made a circuit of the lake and returned to Wainwright on the same day.

Baxter Lake is surrounded by rolling sandy hills, which are higher on the east side than on the west. The hills and the more level country farther back from the lake are of the usual semi-open type common to this region; the predominating willow and poplar growth rarely reaching tree size. Wolf willow occurs as a sparse open growth on some of the grassy hills. In reality there are two lakes joined by a short narrow channel which is crossed by a wooden bridge on the south-west quarter of Section 30, 45, 5, W4. The water is impregnated with soda and a deposit of this mineral is encrusted on the caked sand of the fore-shore. There is no aquatic vegetation to relieve this hard outline and the entire littoral has a deserted barren appearance.

There is little duck feed in the lake. A few fragments of a grass-like pondweed were found on the beach and several bands of Pintail seen in the narrows appeared to be taking this food. Mr. Warren Blynn who lives close to the lake stated that few insects were found in the water. He mentioned two species which occurred in small numbers during the summer months that from his description I took to be a Dytiscus beetle and the larva of one of the smaller Odonata. Mr. Blynn informed me that for a short time in June or July the water is discolored by myriads of tiny salmon-pink "insects" which the ducks fed upon and at that time there droppings were stained pink from this food. Probably these organisms are minute Crustaceae.

The chief feeding ground for the ducks which frequent Baxter Lake is in a wide shallow valley to the south-east. This area includes a number of grassy sloughs most of which contain beds of sago-pondweeds. Good shooting is had along this chain of sloughs and also to the north where there is a crescentic chain of deep alkaline sloughs, commencing in the south-west quarter of Section 20 and ending in the south-east quarter of Section 31, 45, 5, W4.

The 10 acre fraction in the south-east quarter of Section 36, 45, 6, W4, is rough, hilly, sandy land covered with brush. The fore-shore is hard sand similar to other portions of the lake. Immediately to the north and apparently joining on to this fraction is a low wooded point, formerly an island, which extends about half way across the lake. Looking down on this peninsula from a hilltop to the east every point and indentation was defined in clear-cut relief by the glistening, soda deposit on the shore, while the poplar bluffs the grass patches and the brown sand appeared as if set in a matrix of silver.

LITTLE FISH LAKE, ALBERTA.

Little Fish Lake is fed by a small sluggish stream which rises in the Handhills, and is drained by another stream of the same type which eventually empties into the Red Deer River. The water is muddy but fresh and I was informed that large numbers of small fish (Cyprinoids?) are found in the lake. There is a surrounding of low hills, covered with a light growth of spear grass, artemesioe and other dry-belt vegetation—the beach margin is narrow and gravelly.

The small creek, referred to above as an affluent of the lake, flows through a shallow draw, which widens, near the lake, into a wet grassy meadow. In this meadow the creek makes an *S* shaped turn and then gradually widens out into an arm of the lake. Along its marshy banks a growth of Arrow-head was noted, and coontail grew thickly on the muddy bottom. Evidence of Sago Pondweed was also found along the lake shore but the extent of the beds could not be determined owing to the muddy condition of the water. On August 6th, 1923, the mouth of this creek and the shallow arm of the lake into which it flows were occupied by several Greater Yellowlegs, Western Willets, Godwits, a flock of forty Pintail and a few Shovellers and Baldpates. A number of broods of surface-feeding ducks were noted also, and a few Ring-billed Gulls and Common Terns.

KIRKPATRICK LAKE, ALBERTA.

Kirkpatrich Lake was reached on August 11th, 1923, over a fair prairie trail running south and east from Throne. It was found to be a shallow, slightly alkaline lake, approximately five miles

long and four miles wide, surrounded by flat, grassy prairie. A light growth of wolf-willow and rose bushes occur along the low bank, two to three feet high, which defines high water mark. The former shore line is hard and gravelly; the present lake margin which is fifty to one hundred yards lower, around the main body of the lake, is sticky gumbo. I was unable to find evidence that any acquatic plants grow in the lake. No ducks were noted but a mixed gathering of Black-bellied Plover and Lesser Yellowlegs, a few Killdeer and two Wilson's Phalarope were observed. The surrounding country is quite flat, the soil light and apparently of poor quality. Some land is under cultivation and the crops of wheat, oats and rye were thin and short-strawed as compared with crops in other parts of the district.

The lands inspected are of the same general character, viz., dry, flat prairie covered with short grass, artimesioe and a light growth of wolf willow and rose bushes over some areas. Shore line conditions as described above are general around the entire lake.

A farmer of the district interviewed regarding the duck and goose shooting, stated that good sport was to be had on the stubble fields near the lake and that no one attempted to hunt along the lake shore owing to the lack of cover. It is my opinion, however, that some flight shooting could be had from the shore, if pits were dug amongst the wolf willow along the low bank at high water mark. However, as long as farmers allow sportsmen to shoot on their stubble fields, which may be for many years to come, it is doubtful if any other method of hunting will become popular.

MARION LAKE, ALBERTA.

During the summer of 1922 Marion Lake was entirely dry. In August, 1923, there were several small areas of shallow water but the greater portion we found to be alkaline flat grown up with skunk-grass and other weeds. Portions of the former margin of the lake is defined by a low bank, this old shoreline is quite open and surrounded by level prairie. The only brush is on the high grassy portions, near the centre of the lake, which formerly were islands.

SHOOTING LAKE, ALBERTA.

Shooting Lake, lying to the East still contains a considerable area of water in its eastern portion, probably averaging three feet in depth in the deepest portions. The surroundings are similar to those of Marion Lake, viz., sandy open prairie. Apparently the lake is now contained in Sections 15, 22, 14 and 23, 37, 17, W4. There is said to be good shooting, particularly at geese, about this lake.

GRASSY ISLAND LAKE, ALBERTA.

The "Dry Lakes", Currant, Misty and Grassy Island, were visited on August 11th, 1923, over a good prairie trail running south east from Monitor. This trail, which is difficult to follow owing to the many cut-offs, winds around a number of dry lakes grown up with skunk-grass, two of which were identified as Currant and Misty—Grassy Island, which is a sweet-water lake fed by Sounding Creek was found to be nearly at its normal level.

This is a long narrow lake of irregular shape—approximately five miles long and a mile wide at the widest point—surrounded on the west by bare level prairie of little agricultural value and by rolling and more fertile prairie on the east. The shore margin is part sand and part mud and grown up thickly in many places with high sedges. Various aquatic plants grow in the lake and there is evidently no lack of duck feed in this fresh water.

Hunters from Monitor and other villages in the vicinity regard Grassy Island as one of the best shooting grounds of the district, ducks and geese being hunted along the marshy shores—the sedges afford excellent cover—as well as on the adjacent stubble fields.

A grade has been made through part of this quarter and leads to a wooden bridge which spans the narrowest part of the lake. A flight of Pintail passed through these narrows flying close to the bridge late in the evening of August 11th, 1923.

SOUNDING LAKE, ALBERTA.

Sounding Lake lies directly north of Monitor, Alberta, and, when there is water in the lake, the adjacent stubble fields are a favourite shooting ground of hunters from that village. During the year 1922 the lake was dry save for a small area of water near the mouth of Sounding Creek which—when it contains water—flows into the south end of the east arm. In August, 1923, it was not a running stream but rather a succession of muddy pools, connected by a seepage of water.

A considerable amount of grain is grown in the vicinity but the greater portion of the prairie close to the lake is grazing land. In many places the old shore line is well marked by a gravel bank and a fringe of willow and other brush. So far as could be seen the only portions of the lake containing water are in Township 37, 4, W4, and this is quite shallow as horses could be seen wading knee deep some distance from the shore.

Reference to a map will show the lake to be shaped somewhat like a horse shoe—its open end to the south. The lower or southern portions of

the two arms—forming the base of the horse-shoe—in Township 36, 4, W4, are apparently quite dry. The west arm is grown up thickly with foxtail which merges into sedge growth near the centre; the east arm, which has some moisture from Sounding Creek and from several springs, is almost entirely covered with a light sedge growth. This plant also encircles much of the present shore line.

Summarizing the above it may be said that Sounding Lake, at the present time, contains approximately four square miles of shallow muddy water, lying in the centre of an alkaline flat which is surrounded by rolling prairie, on which are occasional clumps of brush.

SULLIVAN LAKE, ALBERTA.

When Sullivan Lake was first visited on October 5th, 1922, the east arm appeared entirely dry and grown up with weeds; the water area in the west arm, surrounded by an expanse of viscous mud one hundred yards or more in width, had a maximum depth of four inches, and I was informed that similar conditions existed farther south. In August of the following year and again in July, 1926, the lake was higher, in some places on the west arm even reaching nearly to the old lake margin which is defined by low cutbanks or a slight rise scattered with large boulders. Everywhere the shore line is open and bare of vegetation but stretches of rough country—badlands—add some variety to the scene. No trees grow near the lake and the land in its immediate vicinity is poor in quality and, for the most part, unfit for cultivation.

The Sullivan Lake region has long been noted for its goose shooting—Canada Geese, Hutchin's Geese and Lesser Snow Geese pass through in large numbers both in the spring and the autumn, and the rarer Ross's Goose is a regular visitor. Practically all goose and duck shooting is done on the stubble, often three miles or farther from the lake.

This region of flat prairie, cultivated fields and scattered poplar bluffs is particularly rich in land birds, our knowledge of local conditions being largely due to the efforts of Mr. T. E. Randall, a resident of the district for the past five years. He reports, amongst other things, the regular nesting of Richardson's Merlin, Blackbilled Cuckoo and Sprague's Pipit, and has taken and recorded specimens of Western boreal stragglers such as Lewis' Woodpecker and Varied Thrush.

On August 9th, 1923—a morning of thick, clinging mist that rising later revealed low, leaden clouds—early exploration of a grassy slough three miles from camp revealed an interesting assortment of waders: Solitary Sandpiper, Killdeer, Lesser Yellowlegs, young Marbled Godwits and Western Willet, and a small flock of Pectoral Sandpipers. Later we walked over miles of dry lake bottom grown up with skunk-grass to the edge of the shallow, muddy lake, passing on the way several stony ridges which once had been islands and colonized by either Ring-billed or California Gulls, as the presence of old nests attested. Here also were tracks, feathers and droppings of Canada Geese which nest somewhere in the vicinity

Along the water's edge Lesser Yellowlegs were common and with them was a single Greater Yellowlegs and two adult female Blackbellied Plover, Common Terns, Ring-billed Gulls, and Franklin's Gulls in winter plumage finished the list of water-birds observed. Returning across the flat to the old lake margin we were surprised to see a Snowy Owl sitting on a dry hummock. Wild, as these birds usually are, it would not suffer a close approach.

In the afternoon came another surprise in the presence of three silent Olive-sided Flycatchers—birds of the year—perched on a telephone wire on the roadside where it passed through a poplar bluff. Mentally associated with the jack-pine forests of British Columbia these flycatchers seemed strangely out of place in this prairie country but Randall stated that each year they appear on this particular stretch of road.

A poplar-fringed pool along a small sluggish stream was searched for Solitary Sandpipers, nesting birds perhaps, which Randall had seen in the vicinity all summer but on this day Grinnell's Water Thrush was the only riparian occupant. Concealed here we watched a flock of Thick-billed Redwings, young and adults, feed on the unripened oats in a nearby field.

The afternoon of July 22nd, 1926, was spent in photographing a female Marsh Hawk and her brood of three downy young, the latter sprawling in attitudes of hostile resentment on a flattened nest hidden amongst wolf willows on the dry prairie. The male parent, perhaps shot, had not been seen for several weeks, so Randall stated. As we stood beside her nest the excited, complaining female swooped repeatedly at us, slanting swiftly down from a distant height to clear our heads, in a sudden and abrupt upward climb, by the narrow margin of two feet or less. Usually after swooping a wide circuit was made in preparation for the next attack but several times she varied her program by settling on a nearby willow. A beheaded juvenile Baird's Sparrow in nestling plumage was the only food beside her nest.

An evening walk took us over the bald prairie where Chestnut-collared Longspurs and Sprague's Pipits were nesting. Young of the latter were flying but perhaps females incubated a second laying for the adult males sang with all the vigour of early summer, fluttering up from the grass to mount higher and higher until almost out of sight, then fluttering eastward again to make the last part of the descent in a swift, straight drop to some chosen objective.

During the forenoon of the following day we visited a section of land on the east side of the lake, reputed to be the chief, if not the only, local nesting ground for Long-billed Curlew. This proved to be rough unbroken prairie containing a few poplar bluffs and small sloughs, and here, in family groups, were eighteen or twenty of the eagerly sought Curlew, usually accompanied by Marbled Godwits. These came quickly to a whistled imitation of the Curlew's call and it was observed that adults accompanying, and showing concern over, fully grown young were in every case males. A discussion of the question suggested by this circumstance would be out of place in the present paper but one cannot help but speculate whether the male Long-billed Curlew does not attend to the duty of incubation, as undoubtedly is the case with certain other waders.

Here Baird's Sparrow was common, the males singing from the topmost twig of a small bush, from a grass stem, or even from the ground, as sometimes did the less common Sprague's Pipit. A Gadwall flushed from her nest of eight eggs concealed under a small willow on the dry prairie and later, beside a muddy slough where we had stopped to examine a gathering of Semipalmated and Baird's Sandpipers was seen leading her small brood of three downies into the sheltering prairie grass

The fall migration of land birds had barely started and the poplar bluffs held only locally raised birds—Clay-coloured Sparrow, Least Flycatcher, Baltimore Oriole, Downy Woodpecker, and Kingbird the only migrant being a male Tennessee Warbler in worn breeding dress. Passing through the "badlands" on the west arm we met with broods of Chestnut-collared Longspur and adults of the less common McCown's Longspur acted as if they had young still in the nest. High in the air two Prairie Falcons teased a soaring Swainson's Hawk, swooping down from above or making vicious horizontal charges. Later we encountered two young Swainson's Hawks tearing and pulling at the carcass of a ground squirrel that lay on the ground between them.

(To be continued)

A PLEISTOCENE FAUNA FROM BRITISH COLUMBIA

By C. H. CRICKMAY

A NEW and rich Pleistocene fossil locality having been discovered near Vancouver, British Columbia, it seems fitting to make a report upon it. The writer has obtained collections from this locality which was exposed in an excavation for a sewer on the south side of Marine Drive, 150 yards west of Angus Street, near the south end of Granville Street, and in a vicinity formerly called Marpole. The fossils occurred in a seven foot layer of fine blue silt, dipping at 4° toward the southeast. This layer overlies a great thickness of blue boulderclay, and is overlain by a considerable thickness of cross-bedded, coarse, yellow sand.

The fauna is made up entirely of living species, all of which favour cold waters—the northern Oregonian to Aleutian faunal provinces. These are mainly pelecypods, but there are also a number of gastropods, several brachipods, two annelids, an echinoid and a barnacle. In all there are 44 forms. Three of these have a very different distribution in the living fauna. The two varieties of *Leda fossa* are now confined to the southern Alaskan Coast, and the variety of *Trichotropis cancellata* is now found only in Japan. This is important because it shows that even though there appears to be no general disturbance of the faunal equilibrium since this fauna was deposited, a few very considerable changes have taken place. A few species, notably *Mytilus edulis*, seem, in their worn and broken condition, to be derived from the reworking of another deposit. They are therefore of no use in correlation.

Twenty-six of the species are common to a fauna of thirty-three forms described from Surrey.[1] Five of them are found also in a fauna of six species which occurs in the Port Haney Brickyard, mentioned by Johnston,[2] but never listed. These correspondences are fairly close, even when compared with what is usually expected of synchronous fossil faunas. They are very close when compared with the usual degree of similarity which

[1]A Pleistocene Fauna from the southwestern mainland of British Columbia. C. H. Crickmay. Canadian Field-Naturalist, XXXIX, 1925.

[2]Geology of the Fraser River Delta Map-area. W. A. Johnston. Mem. 135, Geol. Surv. Canada, 1923.

exists between separate communities among the living marine fauna. In spite of the differences, the proportions between the numbers of individuals of each species are somewhat similar at each locality. None of the species which are common either at Marpole or Surrey are entirely absent from either place. Seven species are fairly numerous at both places. Three of these and one rare species are found also at Port Haney, but the latter fauna is too small to furnish adequate data for correlation.

There are some interesting differences between the Marpole and Surrey lists. The former shows a paucity of varieties of *Chlamys hindsii*, and few individuals; the latter a profusion of these. The former shows many individuals of the species of *Cardium*, and *Paphia;* the latter shows few of these. The former yields a few specimens of *Mytilus edulis;* the latter, none. All these seem related to differences in depth of water: the characteristics of the Marpole fauna suggesting somewhat shallower water. The likelihood of this makes the faunas seem yet more similar than they appear on first sight. In fact they seem, apart from the larger size of the Marpole fauna, to be almost identical, and therefore synchronous or nearly so. The possibility of dating these assemblages has been discussed in the account of the Surrey fauna.

In the faunal lists which follow, all three faunas are included for comparison. The following symbols are used to denote certain things which have appeared to the writer as important:[3]

X denotes occurrence in medium numbers (not repeated with special symbols).

C denotes that species is common.

R denotes that species is rare.

O denotes that two values of pelecypods are together as in life.

b denotes that shells are broken.

W denotes that shells are waveworn.

[3]The Anomalous Stratigraphy of Deadman's Island, California. C. H. Crickmay. Journal of Geology, 1920.

FAUNAL LISTS

	MARPOLE	SURREY	HANEY
VERMES			
Serpula sp.	C	C	
Spirorbis sp.	X		
ECHINODERMATA			
Strongylocentrotus drobachiensis Muller.	R	R	
BRACHIOPODA			
Hemithyris psittacea Gmelin	O		
Laqueus californicus var. *vancouverensis* Davidson	RO		
Terebratalia transversa var. *caurina* Gould	R	RO	
PELECYPODA			
Leda fossa var. *sculpta* Dall	O	CO	RO
Leda fossa var. *vaginata* Dall	RO	RO	
Chlamys hindsii Carpenter	X	CO	C
Chlamys hindsii var. *jordani* Arnold		RO	
Chlamys hindsii var. *kincaidi* Oldroyd	R	CO	
Chlamys hindsii var. *navarchus* Dall	R	RO	
Pododesmus macrochisma Deshayes	R	R	
Mytilus edulis Linne	Rb		
Astarte alaskensis Dall	RW	R	
Thyasira gouldii Philippi	RO		
Axinopsis sericatus Carpenter	RO		
Cardium corbis Martyn	CO	b	
Cardium fucanum Dall	X		
Cardium ciliatum Fabricius	X	CO	R
Serripes groenlandicus Gmelin	CO	CO	
Saxidomus giganteus Deshayes	CO	CO	
Paphia staminea var. *ruderata* Deshayes	CO	RO	
Macoma incongrua Martens	CO	CO	
Macoma brota Dall	W	CO	
Macoma calcarea Gmelin	RO	RO	RO
Macoma inquinata Deshayes	O	RO	
Macoma nasuta Conrad	O		
Spisula voyi Gabb	O	CO	
Schizothaerus capax Gould	R	CO	
Mya intermedia Dall	O		
Mya truncata Linne		RO	
Panomya ampla Dall	O	RO	
Cryptomya californica Conrad	O		
Saxicava arctica Linne	R		
Saxicava pholadis Linne	R		
GASTROPODA			
Acteocina eximia Baird	X		
Lora cf. *fidicula* Gould	R	R	
Admete couthouyi Jay	R	R	
Beringius cf. *marshalli* Dall	R		
Chrysodomus liratus Martyn	Rb	R	R
Trichotropis cancellata var. *quadricarinata* Adams	X	C	
Lacuna cf. *porrecta* Carpenter		R	
Lacuna cf. *unifasciata* Carpenter		R	
Natica janthostoma Deshayes	R		
Natica clausa Broderip & Sowerby		R	R
Puncturella galeata Gould		R	
Lepeta concentrica Middendorf	R		
Margarites pupillus Gould	R		
CRUSTACEA			
Balanus rostratus var. *apertus* Pilsbry		R	
Balanus crenatus Bruguiere	R		

UNIVERSITY OF CALIFORNIA AT LOS ANGELES.

NOTES AND OBSERVATIONS

THE GREAT HORNED OWL IS BENEFICIAL.—Major Allan Brooks in the October, 1929, issue of *The Canadian Field-Naturalist* replies to my article on the food of the Great Horned Owl in Manitoba in the April, 1929, issue of the same journal. He claims that my methods are untrustworthy. I would like to say a few words in defense, for I feel that one of our most valuable birds is being blackmailed by a man who is prejudiced against predatory animals.

Major Brooks (basing his information of second hand observations) claims that hawks and owls swallow the indigestible bones, fur and feathers of its smaller prey only. In the larger individuals it tears these away, eating only the flesh, which leaves no remains in the pellets. For this reason

he considers my data misleading.

He is partially right in this statement but I feel that my data is subject only to a negligible error in considering the food of the nesting birds. Possibly a few large birds were eaten by the owls at a long distance from the nests and no remains were found in the pellets. This applies only to the adult owls. In the case of the young a complete list of the food was obtained, for not only the pellets but feathers and other remains near the nest were considered. In the majority of cases when the remains of larger birds, such as ducks, grouse, grebes and coots were found about the nest they also appeared in the pellets.

He makes a statement rather contradictory to his previous remarks when he says that he has found *nothing smaller* than *Neotoma* and Quail remains in the stomachs of the Great Horned Owl. Both of these are medium sized animals. My observations showed that the larger part of the owl's food was of mice and voles.

It appears that Major Brooks is too apt to generalize in his condemnations and does not duly consider specific data based on fact.—RALPH D. BIRD, *Department of Zoology, University of Oklahoma.*

GOLDEN-CROWNED KINGLETS BREEDING IN THE OTTAWA DISTRICT.—Golden-crowned Kinglets, up to the present time, have been classed among the strictly migratory birds of the Ottawa District. Every spring they appear in large numbers, usually taking their departure before the first of May. The latest record that I have of the Golden-crowned Kinglet in this district is May 5th. In the fall these birds visit us again on their way to their winter homes in southern Canada.

This year, though, one pair of Golden-crowned Kinglets at least, found the Ottawa district so inviting that they decided to go no further north.

On July 25th, while camping at Alcove, Que., I was greatly surpised to observe a pair of these tiny birds. The female appeared very ragged and worn which led me to believe that the birds were nesting in the vicinity. On July 31st, I was attracted by the cries of young birds in a large spruce tree near our camp and climbed the tree to investigate. As soon as I started to climb the tree the pair of kinglets appeared, the female having a small moth in her bill. In their excitement the birds came quite close, thus allowing me to identify them with certainty as Golden-crowned Kinglets. I noticed in particular, the yellow stripe on the crown and the very small size of the birds. Their *zee-zee* of alarm, continually repeated, was very distinctive.

After searching for the nest without any success, I decided to sit still, hoping that the parent birds would attempt to feed the young and thus reveal their secret. After a great deal of hesitating and deliberating, the female flew into the nest with her moth. Instantly the young birds set up a clamour which gave away the position of the nest. In trying to get out to the nest I shook the limb, causing the young to fly. The young could fly exceptionally well and we had the greatest difficulty in catching three of the youngsters for banding purposes. They were a dull olive-green, with no visible crown-mark. They bear bands No. C4393, C4394 and C4395.

The nest was suspended at the extreme end of a branch at a height of about 25 feet from the ground. It was made largely of moss and lichens, lined with hair, a few feathers and fine strips of bark. As the nest was made of green moss, the colour harmonized perfectly with the green of the spruce bough, making the nest almost invisible at a distance of six feet.

The nest is $2\frac{3}{4}$ inches high and $3\frac{1}{2}$ inches across the top. The walls of the nest are bulky but pliable owing to the nature of the material of which it is built. The nest is now in the custody of Mr. C. E. Johnson of the National Museum.

The presence of this pair of Golden-crowned Kinglets nesting in the Ottawa district would lead to the conclusion that there are others of this species nesting here although unobserved. The Golden-crowned Kinglet is evidently very adept at concealing its nest and likely this is why it has never been noticed nesting here before.—D. H. BAKER.

NOTE ON THE WHITE LIPPED SHREW AND OTHER SPECIES IN THE PARRY SOUND DISTRICT.—On August 11th, 1929, I arrived at Still River, Parry Sound, where I spent two weeks studying the wild life. Birds were, of course, quiet, as the migration season had almost arrived, yet, we heard songs from the following:—Northern Water Thrush, Mourning Warbler, Olive-sided Flycatcher, White-throated Sparrow.

Our total bird list was 79, including the Pileated Woodpecker, which was heard or seen three times; Canada Jay, seen twice, two birds each time, and once we had a very good view at short range, but they never came near the cabin; perhaps the deer hunters and the woodsmen are exterminating the race of Jays that come around for food, stolen or given. Man takes the liberty of dealing out death to any wild thing that interferes with his freedom to leave eatables around where they can be stolen, regardless of the fact that a little more care would leave the wildling its life and save the property

at the same time. Black-backed Woodpecker was seen once, from the track on the first morning, and none could be found later. Among the warblers the Cape May and the Blackcap were the rarest, though other kinds were seen. Hawks were scarce. Broadwings were recorded a few times, but the only constant occurrence was the Red Tail, which was seen almost every day. A pair of Ospreys had their nest a few miles away and only a hundred yards from the water on what I would have called a Rampike, having heard that name applied to a tree whose top was broken off some distance above the ground, but on the competent authority of Mr. Frank Robertson, Forest Guardian on our lake (Noganosh) I can state that the nest was placed on a shuko. The term Rampike being reserved for a Shuko which lay in the water with the roots exposed, and if the rampike is broken off very short so that it does not amount to much more than the roots only its name is Ragenooter. The Ospreys were both in view and after calling from some distance one of them came and lit on the nest which was some 60 or 70 feet above the ground, and it remained there until we walked away. The young were not visible but were probably in the nest, judging by the concern exhibited by the parents. The Barred Owls were interesting to our party on account of their rarity in Lower Ontario. They called almost every night but we did not hear them regularly after the first few nights. That is the way with sounds to which we become accustomed. A Bartram Sandpiper may waken one when flying over in the night but a robin has no chance of doing the same thing. The first night was thoroughly disturbed by the Barred Owl, everyone being awakened to hear it, and while it doubtless called every night its importance dwindled as the days wore on. Once or twice I was up early enough in the morning or late enough at night to hear them outside but there never seemed to be more than one. Great Horned Owls were more common but the Screech Owl was absent.

Humming-birds were not uncommon, and on the 22nd, Mr. Dale found an exceptionally beautiful nest, recently built but abandoned before it was used. It was shaped much like the nest of a Gnat Catcher—much deeper than the ordinary style for the Humming Bird.

The point of exceptional interest, however, in the whole trip was the presence of the Water Shrew in some numbers. The first night's trapping yielded one in the very first trap and raised our hopes very high indeed, but they did not continue at that rate and with an average of about a hundred traps out per night we got eight in the two weeks. Still River is only about 50 miles north of Scotia Junction where Mr. J. F. Calvert picked up the dead shrew which was reported in the C.F.N. These animals were never near running water for the very good reason that we had no running water. They were caught beside logs in damp places usually near the water, the single exception being taken in a Microtus runway in a sphagnum swamp where the chain fern, Woodwardia, grew abundantly.

Also of interest was the abundance of Jumping Mice, about a dozen of the Woodland species being taken and nearly twice than many of the Meadow Jumping Mouse. The Long-tailed Shrew was taken in almost every night's trapping. One specimen of the Northern Flying Squirrel was secured with three young about half grown. Porcupines were seen daily though they were not as abundant as we found them at French River three years ago. On the 19th we paddled up to one who was swimming across an arm of the lake. He came over to the canoe with the apparent intention of getting in but could not reach and we followed him into shore where he leisurely disappeared into the trees.

The little Chipmunk, *Eutamias* was fairly common. I am not sure that this is not the farthest south that this animal has been taken.

On the last day our canoe caught up to a Blowing Adder, *Heterodon*, swimming across an arm of the lake. While not very long he was very thick and made a great show of resistance, flattening the head and neck to fully double the normal width and when we got him on shore he entertained us with the open mouth, the head being thoroughly flattened to about $2\frac{1}{2}$ wide and the mouth held open for perhaps 30 seconds at a time.—W. E. SAUNDERS.

DOWITCHER IN MIDDLESEX COUNTY, ONT.—On Sept. 6th this bird was noted for the first Autumn record in the county, when two individuals were found feeding in a little mud-puddle close to the city. The mud in this depression is particularly sticky, so much so that a cray-fish hunter had to get his friend to pull his leg free. Other birds present, Yellow Legs, Baird's Sandpiper, etc., who were in shallower water than the Dowtichers walked very slowly and appeared lame because each foot had to be pulled slowly out of the mud, a circle of which could be seen adhering to the leg above the foot.—W. E. SAUNDERS.

SEA OTTER INCREASING.—According to Alaskan officials of the United States Bureau of Fisheries, sea otter are on the increase in western Alaska

waters. Reports recently received from the crew of one trading schooner state that over 20 sea otter were counted in an hour's run. One Aleut trapper claims that he could have killed at least 100 sea otter on the beach of Unalga Island. The animals are absolutely protected at this time. A real fine sea otter skin is worth $1500 at the present time.—*American Fur Breeder.*

CORRESPONDENCE

Ottawa, 31st October, 1929.

Dear Sir:

The interesting paper entitled "Bird Notes from Canadian Labrador, 1928", by P. A. Taverner, which appeared on pages 74 to 79 of your issue for April, 1929, calls forth several comments that I should be glad to see recorded in *The Naturalist.*

Mr. Taverner states that "for the purpose of limitation of field, various ornithological writers have arbitrarily taken Seven Islands Bay as the western limit of the Canadian Labrador". As a matter of fact, the western limit of the Canadian Labrador at the shore of the Gulf of St. Lawrence has, in practically all recent ornithological publications dealing with the region, been considered to be the "point where the fiftieth parallel of latitude strikes the coast". This point was adopted by Dr. Charles W. Townsend in his well-known and valuable publications on the subject, and has been followed by later authors, including not only ornithologists, but also Dr. Harold St. John, the botanist. The parallel of fifty degrees, north latitude, crosses the coast of the Gulf of St. Lawrence just south of the mouth of Rocky River where the village of Shelter Bay is situated. This is about twenty-two miles southwest of the Bay of Seven Islands, and the intervening territory should be included in the Canadian Labrador, as that term is currently used in fuanal and botanical writings.

In writing about the Common Murre, Mr. Taverner refers to the Bird Sanctuary near Betchewun as "Egg Island Bird Reserve". This is an unfortunate addition to the synonomy of a locality already overburdened with names. The official title of the bird sanctuary in question is "Betchouane Bird Sanctuary", Betchouane being a French form of Betchewun. On Admiralty charts the principal island in the sanctuary is called "Gun Island", in the writings of Dr. Charles W. Townsend it is called "Bald Island", on the provincial Rinfret map of the area this island and a small one beside it are called "Perroquets St. Charles", while the local residents commonly use the names "Puffin Island" (English) or "Ile aux Carculeaux" (French).

On page 77 Mr. Taverner, speaking of Cormorants, says, "Visiting a small rookery of Double-crests later at Natashquan we found the proportion of grown birds present to occupied nests about 15 to 1. From general impression this does not seem to be far from the state of affairs shown in these rookeries. Considering that undoubtedly a number of birds are away fishing at any one time this is probably not an excessive proportion between nests and breeding, non-breeding and adolescent birds." This general conclusion is very surprising and extraordinary. Nowhere else in the literature relating to the Double-crested Cormorant have I seen anything comparable to it. Munro (*Can. Field-Nat.*, vol. XLI, p. 104) estimated that only 25% of the grown birds of this species at Lake Manitoba were non-breeding. The actual conditions at the Natashquan colony, which are admittedly about as stated by Taverner, are special and are easily explained, for in its vicinity extensive areas of shoal water with sandy bottom produce excellent conditions for Cormorants' fishing and unattached birds do congregate there in some numbers, while nesting birds from the colony at Pashashibu Lake probably fly there daily for fishing. The small size of the only safe nesting-rock available in the area prevents much increase of the local nesting colony. In the course of extended observations at other colonies I have never found the number of grown birds present to be more than a little in excess of twice the number of nests. Often, after the young are hatched, it appears to be somewhat less than twice the number of nests. Adolescent birds are comparatively scarce at most breeding colonies where I have made detailed observations, and I have considered it a fair presumption that they passed most of the summer at such exceptionally good fishing places as the vicinity of Natashquan. Furthermore, if all the eight young of the two previous years survived (which is certainly not the case) and returned to the home colony in summer without nesting there, the proportion of grown birds to nests in the average colony would still be less than ten to one, because of some pairs nesting for the first time or for the second time and having either no grown offspring or only a possible four. An actual general average of fifteen grown birds to each nest would require a most remarkable proportion of non-breeding birds in fully adult condition. Mr. Taverner's general conclusion appears to me to state a proportion of birds to nests that is at least 400% too great, and probably much more.

Sincerely yours,

HARRISON F. LEWIS.

INDEX TO VOLUME XLIII

Black face type indicates a new species.

A., R. M., Review by... 109
Abitibi, Molluscs..... 104
Acalypha virginica..... 20
Acanthinula harpa..... 104
Acanthis hornemanni exilipes..... 53
hornemanni....53, 54
linaria..... 150
fuscescens..... 53
hobœllii..... 54
linaria..... 53
rostrata..... 53, 54
Accipiter atricapillus.... 16
velox..... 31
Acholla multispinosa.... 29
Acmaea testudinalis..... 160
Acteocina eximia..... 206
Actitis macularia..... 148
Actodromus fuscicollis...11, 32
Adder, Blowing..... 208
Adder's Mouth, Green.. 99
White..... 38
Tongue..... 99
Admete couthouyi..... 206
Aegialitis hiaticula hiaticula..... 11
semipalmata... 11
Agallia sanguinolenta... 30
Agelaius phœniceus....97, 150
Aglais antiopa.....27, 134
j-album..... 134
milberti..... 134
Agriolimax campestris... 104
Agriotes fuscosus..... 27
limosus..... 27
Agrotis collaris..... 28
fennica..... 28
Alca torda..... 75
Alces americana americana..... 159
Alcock, F. J., Devonian plant..... 47
Alydus conspersus..... 29
eurinus..... 29
Alypia langtoni..... 28
Amblycistes hegon..... 28
vialis..... 28
Ambystoma decorticatum 138
macrodactylum..... 138
paroticum..... 138
tigrinum.....82, 83
Amesia latifolia.....94, 98
monotropoides. 99
Amphipoda..... 105
Anas platyrhynchos..... 83
rubripes..... 148
Anatase..... 117
Andalusite..... 120
Anderson, R. M., Water Shrew..... 136
Aneides ferreus..... 138
Animal Ecology, Review of..... 22
Annotated list of the Mammals of Aweme, Manitoba.. 155
Annual Report of the McIlwraith Ornithological Club, 1928 83
Antelope.....179, 181
Anthacoris borealis..... 29
musculus..... 29
Anthaxai æneogaster.... 27
Anthicus formicarius.... 28
Anthobium horni..... 27
pothos..... 27
Anthropology, Fieldwork in..... 135
Anthus rubescens..... 96
spinolettus pensilvanicus..... 56
Antrostomus vociferus vociferus..... 149
Apatite..... 120
Apœcasia subaequaria... 28
Aquila chrysaëtos..... 17
Aradus abbas..... 29
inornatus..... 29
lugubris..... 29
similis..... 29
tuberculifer..... 29
Archibuteo lagopus sanctijohannis..... 16
Archilochus colubris..... 149
Arctocorixa alternata.... 30
Arctostaphylos alpina... 14, 34
Ardea herodias herodias. 148
Arenaria interpres..... 12
morinella..... 124
Argynnis atlantis..... 134
Arquatella maritima.... 78
Asellus communis..... 105
tomalensis..... 105
Asio accipitrinus accipitrinus..... 31
flammeus..... 31
magellanicus heterocnemis..... 32
Aspidium Filix-mas.... 20
Goldianum..... 20
spinulosum..... 20
Asplenium Ruta-muraria 20
Trichomanes..... 20
viride..... 20
Astarte alaskensis..... 206
Asterias vulgaris..... 187
Asteroidea..... 187
Astragalus..... 180
Astragalinus tristis tristis 150
Astur atricapillus atricapillus..... 16
Auk, Razor-billed..... 75
Avocet..... 72
Axinopsis sericatus..... 206
Azure, Spring..... 27

Badger..157, 177, 179, 181
Bœolophus bicolor..... 52
Baillie, J. L., Early List of Birds..... 161
European Hare.... 64
Starlings..... 21
Baillie, J. L., Wm. Couper..... 169
Baker, D. H., Golden-crowned Kinglet... 207
Balanus crenatus..... 206
rostratus apertus.... 206
Baldpate..72, 129, 137, 180, 185, 200..... 202
Bapta vestaliata..... 28
Bare Island 10
Barn Owl in Manitoba.. 83
Barn Swallows..... 59
Bartramia longicauda... 85
Bartramian Sandpiper nesting near Toronto 85
Barytes..... 120
Basana dimidiata..... 29
Basilarchia archippus... 97
arthemis..... 134
Basswood..... 188
Bat, Hoary..... 156
Little Brown....137, 156
Red..... 156
Silver-haired..... 156
Battle Lake, Alta..... 153
Baxter Lake, Alta..... 202
Bear, Black.....156, 181
Grizzly..... 181
Beaver.....158, 179, 181
Beaver Hill Lake, Alta.. 130
Beetle, Colorado Potato Tortoise..... 27
Bellamira scalaris..... 28
Bembecia marginata..... 27
Beringius marshalli..... 204
Big Hay Lake, Alta.... 154
Bird, R. D., Great Horned Owl.....79, 206
Bird Notes from the Canadian Labrador, 1928 74
Bird-banding returns, 42, ...86, 138, 192
corrections..... 137
Bird census, Christmas, 1928.....34, 107
Birds of a suburban garden—additional notes..... 51
Birds of Ontario..... 161
of Quebec..... 93
of Western Canada, 2nd ed., Review... 109
Birds, Soaring flight of.. 165
Bison..... 181
Bittern..148, 177, 180, 201
Bittern Lake, Alta..... 152
Black Tern at London, Ont..... 63
Blackbird, Brewer's 70, 72, 107, 129, 155, 181, 182, 185
Red-winged....34, 37, 72, 97, 150, 181
Rusty.....100, 155, 181, 182, 183
Yellow-headed..... 72
Blarina brevicauda brevicauda.....81, 82, 156
Blue, Greenish..... 134

Bluebird....152, 181
Mountain....181, 182
Blue-gray Gnatcatcher at Toronto.... 85
Bobcat, Northern.... 157
Bobolink....178, 181
Bombus couperi.... 173
Bombycilla cedrorum.... 150
Bonasa umbellus togata....40, 148
Bonassa umbellatus.... 83
Botany, Field-work in.. 135
Botaurus lentiginosus... 148
Botrychium angustisegmentum....94, 97, 99
dissectum.... 99
obliquum.... 99
onondagense.... 98
ramosum....96, 97, 98
simplex.... 97
virginianum.... 20
Brachiopoda....145, 206
Bradshaw, F., Sage Grouse.... 197
Branta canadensis canadensis.... 148
Brenthis myrina.... 97
Brewer's Mole in Ontario.... 42
Brimley, J. F., Hemiptera of Rainy River 28
Notes on Insects... 27
Broley, C. L., Cerulean Warbler.... 21
Brooks, A., Hawk and owl pellets.... 160
Brown, J. R., Downy Woodpecker.... 108
Flicker murderer... 165
Brown Creeper and other birds wintering on St. Helen's Island (Montreal).... 50
Bubo virgianus....79, 149
heterocnemis... 32
Buccinum undatum....159, 160
Buffalo.... 181
Buffle-head..36, 107, 185, 201
Bufo boreas boreas.... 138
Bunting, Indigo...52, 97, 150
Lapland.... 153
Lark.... 72
Snow.34, 36, 37, 38, 54
Buteo borealis.... 172
lineatus lineatus.... 148
platypterus.... 148
Butterflies observed in the Sudbury dist., Ont.... 134
of Quebec.... 93
Butterfly, Monarch.... 28

C., N., Book review.... 190
Cabbage, European (butterfly)....173, 180
Calcarius lapponicus.... 53
Calyptogena elongata.... 93
gibbera.... 93
pacifica.... 93
Campylenchia latipes.... 30
Canachites canadensis canadensis.... 12
labradorius.... 12
Canis latrans.... 157
nubilis.... 179
occidentalis.... 157
Canvasback..72, 130, ...185, 200, 201
Cardinal..36, 37, 38, 52, 188
Cardinal at Toronto... 188
Cardinalis cardinalis...52, 188
Cardium ciliatum.... 206
corbis.... 206
fucanum.... 206
Carpodacus purpureus purpureus....52, 150
Carterocephalus palæmon 28
Cartwright, B. W., Barn Owl.... 83
Obituary of Harrold 132
Castilleja coccinea.... 180
Castor canadensis canadensis.... 155
Cat, Wild.... 181
Catbird....151, 181
Catocala unijuga.... 28
Census, Christmas Bird 1928....34, 107
Cepphus columba.... 167
Cerasa basalis.... 30
bubalus.... 30
diceros.... 30
taurina.... 30
Cerastium alpinum...33, ...53, 54, 55
Ceratocapsus digitatus... 29
modestus.... 29
pumilus.... 29
Cercheneis sparveria sparveria.... 148
Certhia familiaris.... 79
americana.... 151
Cervus canadensis manitobensis.... 159
Ceryle alcyon.... 149
Chætura pelagica....78, 149
Change in ideas about Foraminifera.... 190
Charadrius dominicus dominicus.... 11
Chariessa pilasa.... 28
Chat, Long-tailed.... 70
Chelymorpha cassidea... 27
Chenopodium album.... 102
Chenucha virginica.... 28
Chickadee..35, 36, 37, 38, 39, 40.... 151
Black-capped....34, 35, 37, 38, 50, 51, 189
Brown-headed.... 79
Chestnut-backed... 107
Hudsonian...34, 57, 154
Long-tailed.... 34
Mountain.... 34
Chickadee-Grouse alliance.... 39
Chickadees caught by tanglefoot.... 189
Chilliwack River.... 2
Chipmunk.... 208
Eastern Gray.... 157
Northern.... 157
Chirida guthata.... 27
Chlamys hindsii.... 206
jordani.... 206
kincaidi.... 206
navarchus.... 206
Chordeiles virginianus virginianus.... 149
Christmas Bird Census 1928....34, 107
Chrysodomus decemcostatus.... 160
liratus.... 206
Cicindela longilabris.... 28
purpurea.... 28
repanda.... 28
Circus hudsonius....96, 148
Citellus columbianus....70, 71
Franklinii....82, 157
richardsonii....70, 157
tridecemlineatus.... 82, 157, 182
Cixius basalis.... 30
Clastoptera obtusa.... 30
proteus.... 30
Clethrionomys gapperi loringi.... 158
Clidophora gouldiana.... 159
Cloak, Mourning....27, 134
Cocceius pylades....28, 134
Coccyzus erythrophthalmus.... 149
Cochlicopa lubrica.... 104
Cœnonympha inornata... 134
Colaptes auratus....83, 149
Collins, W. H., National Museum Field-work 134
Colpocephalum chrysæum chrysophæum.... 54
Collaria meilleurii.... 29
Colymbus auritus.... 83
Comma (butterfly).... 27
Compositae.... 180
Comptobrochys grandis nitens.... 29
Conjuring Lake, Alta... 186
Conotelus obscurus.... 27
Conotrachelus nenuphar.. 27
Contribution to the knowledge of the avifauna of northeastern Labrador... ....11, 31, 52
Convolvulus sepium.... 180
Coot, American....34, 35 81, 83, 107, 166, 185
Copper (butterfly).... 28
Copper American (butterfly).... 134
Corallorrhiza striata.... 97
Coral-root, Striped.... 97
Coregonid Fishes of the Great Lakes (Review of).... 191
Corizus crassicornis.... 29
Cormorant, Common... 76
Double-crested.... 100, 101, 102, 107, 129, 130, 209
White-crested.... 107
Corn Borer.... 108
Corvus brachyrhynchos brachyrhynchos 44, 83, 149

Corvus corax principalis. 34
Corythucha ciliata..... 29
cydoniæ..... 29
marmorata..... 29
pallipes..... 29
Cosmopepla bimaculata.. 29
Couper, William..... 169
Cowbird..78, 96, 129, 150, 201
Coyote..102, 157, 179, 181
Crane, Sandhill.....131, 177
Creciscus jamaicensis.... 83
Creeper, Brown..34, 35, 36, 37, 38, 50, 51, 79, 151
Crepidula fornicata..159, 160
plana..... 160
Crescent, Pearl..... 134
Crickmay, C. M., New Pelecypod..... 93
Pleistocene Fauna in B.C..... 205
Criddle, N., Memoirs of the 80's..... 176
Criddle, S., List of Mammals..... 155
Crossbill..... 201
Crow..10, 36, 37, 38, 40, 41, 81, 83, 101, 107, 129, 149, 181, 182
Clark's..... 34
North-west..... 107
Crustacea.....104, 202, 206
Cryptoglaux acadia acadia 149
Cryptomya californica... 206
Cuckoo..... 162
Black-billed.51, 149, 204
Yellow-billed..... 51
Cultus Lake..... 1
Curculis, Plum..... 27
Curlew, Long-billed..71, 178, 180, 205
Cutworm..... 180
Cyanocitta cristata cristata..... 149
Cygnet Lake, Alta..... 185
Cylisticus convexus..... 106
Cymus angustatus..... 29
discors..... 29
luridus..... 29
Cyprinoid..... 202
Cypripedium acaula albiflorum..... 98
arietinum..... 96
parviflorum.....98, 180
parviflorum pubescens.....97, 180
Cyrtolobus vau..... 30
Cystopteris bulbifera.... 20
fragilis..... 20

D., J. R., Review by.. 22
Dafila acuta..... 83
Dale, E. M. S., Black Tern..... 63
Dowitcher..... 63
Dall, W. H., Marine molluscs..... 159
Danais archippus..... 134
Dandelion..... 180
Dear, L. S., Migration of Robins..... 166
Deaths among Coots at Summerland, B.C.. 166
Decapoda..... 104
Deer, Mule.....159, 179, 181
Northern White-tailed.....159, 181
White-tailed..... 179
Deer, Protection of.... 9
Dendroica æstiva æstiva 97, 151
castanea.....79, 151
cærulescens cærulescens..... 151
coronata..... 151
magnolia..... 151
pensylvanica..... 151
striata..... 97
vigorsi..... 97
virens..... 151
Deraecoris fasciolus..... 29
Diaphnidia pellucida.... 29
Dicamptodon ensatus ... 138
Dicerca prolongata..... 28
Dickson, Geo. H., Bird migration..... 38
Dicrostonyx hudsonius 17, 31, 32
Dipper..... 34
Distribution of the Basswood at Parry Sound, Ont..... 188
Docophorus communis...53, 54
ocellatus..... 34
Donacia..... 27
Dorytomus..... 27
Dove, Mourning..20, 37, 51, 52, 129, 180
Dowitcher..63, 78, 131, 208
Long-billed..... 185
Dowitcher at London, Ont..... 63
Dowitcher in Middlesex Co., Ont..... 208
Dræculacephala mollipes. 30
Dryobates pubscens medianus..... 149
villosus..... 149
Duck..... 161
Black...35, 36, 37, 148
Harlequin..... 107
Ruddy.....72, 183
Scaup.....36, 107, 155
Scaup, Lesser..36, 72, 107, 129, 130, 200, 201
Wood..... 161
Dumetella carolinensis... 151
Dusky-wing, Northern . 134
Dymond, J. R., Brown Bats..... 137
Dytiscus..... 202

Eagle, Bald..35, 37, 107, 166
Golden.....17, 34, 35
Gray Sea..... 17
Northern Bald....17, 148
Early List of Ontario Birds..... 161
Echinarachnius parma.. 187
Echinodermata..... 206
Echinoderms from the Gulf of St. Lawrence 187
Echinoidea..... 187
Ecology, Animal. Review of..... 22
Eider, King..... 172
Elasmostethus cruciatus.. 29
Elateridæ..... 58
Elk.....159, 179, 181
Empidonax minimus...78, 149
trailli alnorum.... 52
Enemy of the Corn Borer 108
Enoclerus ichneumoneus 28
Enodia portlandia..... 134
Entylia carinata..... 30
Eoorthis ochus..145, 146, 147
cf. *ochus*.....145, 147
Eoorthis* var. *concentrica.....145, 147
Epargyrens tityrus.....97, 134
Epicnaptera americana.. 28
Epilobium..... 180
Epipactis, Broad-leaved 94, 98, 99
Equisetum..... 180
Erigeron uniflorus..... 54
Erodinus monticola..... 27
Erethizon dorsatum dorsatum..... 159
Euarctos americanus americanus..... 156
Euclidea cuspidea..... 28
Euconulus chersinus polygyratus..... 104
fulvus..... 104
European Hare, a new mammal for Toronto 64
Eurymus interior..... 134
Eusarcus newlini..... 66
Euschistus euschistoides 29
tristigmus..... 29
variolarius..... 29
Euspira grœnlandica.... 160
heros..... 160
Eutamias..... 208
minimus borealis... 157
Evening Grosbeak..... 190
Evotomys gapperi..... 81, 82
Ewing, H. E., Manual of external parasites (Review of)..... 190
Excursions, Spring, 1929 85
Eye, Pearly..... 134

Fairbairn, H. W., Distribution of Basswood 188
Falco columbarius..... 31
islandus..... 18
peregrinus anatum.. 31
rusticolus absoletus. 17
sparverius..... 96
Falcon, Peregrine..... 183
Prairie.....100, 205
Faun (butterfly)..... 134
Faunal Survey of the Lake Abitibi region, Ont., Review..... 109
Faunal Survey of the Lake Nipigon region, Ont., Review..... 109
Feltia subgothica..... 28
volubilis..... 28

Fern, Onondaga Moonwort 98
Osmunda 98
Ostrich 98
Ferns of Quebec 93
Festuca ovina 53
Field-work of the National Museum of Canada, 1929 134
Finch, Grey-crowned Rosy 35
Pine 107
Purple 36, 37, 52, 150, 201
Firefly 28
First record of the Prothonotary Warbler in the Toronto region 164
Fisher 179, 181
Flicker 36, 39, 83, 149, 165, 201
Boreal 100, 129, 154, 182
North-west 107
Red-shafted 34
Flicker murderer 165
Fly, Stable 180
Flycatcher, Alder 52
Crested 149
Least 78, 149, 205
Olive-sided 149, 204, 207
Foerster, R. E., Migration of salmon 1
Foraminifera 190
Fossil wood 47
Fox 179
Arctic 16
Red 157, 181
Fragaria 180
Fraser, F. J., Heavy detrital Minerals 117
Fratercula arctica 75
Fritillary, Silver-bordered 97
Frog 179
Fulica americana 83
Further observations on Canadian land and fresh-water crustaceans, made in 1928 104

Gadwall 72, 131, 205
Gallinago delicata 95, 148
Gallinula chloropus cachinnans 165
Gallinule, Florida 36, 165
Galloway, J. J., Change in ideas about Foraminfera (Review of) 190
Galls on briar 28
on goldenrod 28
Game protection 6
Gannet 78
Garganus fusiformis 29
Garnet 120
Garnett, W. J., Starling 84
Gastropoda 146, 206
Gavia immer 74, 148
stellata 75
Gemma gemma 159
Gentiana 180
Geological succession 23
Geology, Field-work in, 135
George Rivers White, 1856-1927 103
Geothlypis trichas trichas 151
Gerald, W. P., Bird-banding 39
Glaucomys sabrinus canescens 158
Glaucopsyche couperi 173
Glimpses of little-known western lakes and their bird life 70, 99, 128, 152, 181, 200
Gnatcatcher 208
Blue-gray 85
Godwit 202
Marbled 72, 73, 101, 129, 130, 131, 185, 204, 205
Golden-crowned Kinglets breeding in the Ottawa district 207
Golden-eye 36, 38, 155
American 34, 35, 37, 107, 185
Barrow's 107
Goldfinch, American 35, 37, 150
Gonoides mamillatus 14
Goose 161
Blue 180
Canada 129, 131, 132, 148, 153, 177, 180, 185, 201, 204
Hutchins' 131, 132, 153, 186, 204
Lesser Snow 180, 186, 204
Ross's 204
Snow 177
White-fronted 186
Gopher, Pocket 81, 82, 157
Scrub 157
Striped 157
Goshawk, American 16, 34, 35, 50, 178, 180
Grackle, Bronzed 37, 79, 96, 129, 150, 178, 181, 183
Grape-fern, Branching 96, 97, 98
Cut-leaved 99
Lance-leaved 94, 97
Little 97, 98
Narrow 99
Oblique 99
Graphocephala coccinea 30
Grasshopper Sparrow at Toronto, Ont 166
Grass-nymph, Common 134
Grassy Island Lake, Alta. 203
Great Horned Owl 108
Great Horned Owl in Manitoba 79
Great Horned Owl is beneficial 206
Grebe, Eared 100, 130, 201
Holboell's 107, 129, 166, 181, 182, 184, 201
Horned 34, 35, 36, 82, 83, 101, 107, 180
Grebe, Pied-billed 180, 185
Western 107, 201
Grindelia squarrossa 30
Groh, H., Gumweed 106
Western Ragweed 137
Grosbeak, Evening 35, 51, 190
Pine 34, 35, 36, 51, 166, 167
Rose-breasted 150
Grouse, Fluctuation of 162
Grouse, Pinnated 35, 178, 180
Richardson's 70
Ruffed 34, 35, 37, 38, 40, 81, 83, 129, 148, 180, 182, 185, 201
Sabine's 107
Sage 197, 198, 199
Sharp-tailed 34, 35, 38, 83, 129, 177, 180, 182, 185
Spruce 153
Guillemot, Pigeon 107, 167
Gull 38
Bonaparte's 183, 184, 201
California 34, 100, 101, 102, 129, 204
Franklin's 72, 101, 102, 129, 130, 180, 182, 185, 201, 204
Glaucous 75
Glaucous-winged 9, 10, 167, 189
Great Black-backed 35
Herring 34, 35, 36, 37, 107, 148
Ring-billed 35, 36, 202, 204
Short-billed 107
Gumweed (*Grindelia squarrosa* (Pursh) Dunal) in Ontario 106
Gypona striata 30
Gyrfalcon, Black 17
White 17, 18

Habenaria fimbriata 98
albiflora 98
macrophylla 98
obtusata 98
orbiculata 98
psycodes 99
Hackberry 50, 51
Hæmorrhagia diffinis 28
thyobe 28
Haliæëtus albicilla 17
leucocephalus alascanus 17, 145
Halkett, A., Review by, 191
Hall, E. R., Protection of Moose 59
Hantzsch, B., Avifauna of Labrador 11, 31, 52
Hardyia metion 146, 147
Hare, European 64
Harrold, Cyril Guy (Obituary) 132
Hart, J. L., Abitibi land molluscs 104

Hawk, Broad-winged 148, 208
Cooper's....36, 37, 180
Duck...10, 31, 178, 180
Ferruginous Rough-leg.....74, 100, 180
Marsh..37, 96, 148, 160, 178, 180, 182, 204
Pigeon..... 31
Red-shouldered...36, 148
Red-tailed..37, 99, 108, 172, 178, 180, 208
Rough-legged.....16, 37
Sharp-shinned 31, 37, 153
Sparrow..34, 36, 37, 96, 100, 148, 178, 180
Swainson's..70, 129, 178, 180, 183, 205
Western Red-tailed 129 182
Hawkmoth, Humming-bird..... 28
Hedymeles ludovicianus.. 150
Hemiptera found in the Rainy River district 28
Hemithyris psittacea.... 206
Henricia sanguinolenta.. 187
Heodes hypophlæas..... 134
thoe..... 28
Heron..... 162
Great Blue..35, 51, 129, 148, 200
Great Blue (Northwest)..... 107
Hessian-fly..... 180
Heterodon..... 208
Hierofalco gyrfalco candicans..... 18
islandus..... 17
obsoletus..... 17
Hirundo erythrogastra... 150
Holboell's Grebe near Kingston, Ontario, in midwinter..... 166
Holothuridea..... 187
Homæmus aeneifrons... 28
Hope, C. E., Bartramian Sandpiper..... 85
Pigmy Shrew..... 168
Horcias dislocatis gonophorus..... 29
pallipes..... 29
Hornblende..... 120
Horn-fly..... 180
Huenella jasperensis 146, 147
Hummingbird..... 208
Ruby-throated..... 149
Hyalella azteka..... 105
Hyaloides vitripennis.... 29
Hydnocera humeralis.... 28
Hydrometra martini..... 30
Hyla regilla..... 138
Hylocichla fuscescens fuscescens..... 151
guttata pallasi..... 152
mustelina..... 151
ustulata ssainsonii.. 152
Hypena humeralis..... 28
Hyperetis amicaria..... 28
Hypersthene..... 123
Hyphantria cunea..... 28

Ichthyura inclusa..... 28
Icterus galbula.....97, 150
Idiocerus alternatus..... 30
lachrymalis..... 30
Illustrations:
Anatase..... 126
Andalusite.....124, 125
Apatite..... 121
Barytes..... 122
Calyptogena gibbera 93
Couper, Wm..... 169
Dolomite..... 124
Fossil tree..... 47
Fossil wood quarry 48
Garnet.....124, 126, 127
Hornblende..... 126
Hypersthene..... 124
Marbled Godwits and Lesser Yellow-legs..... 71
"Ozarkian" fauna opp..... 145
Rutile..... 126
Salmon migration route..... 2
Sphene..... 125
Titanite..... 125
Tourmaline..... 113
White, George Rivers, opp..... 103
White, Lt.-Col. Wm., opp..... 69
Zircon.....118, 127

Ilyanassa obsoleta.....159, 160
Indiana, Geology..... 65
Indians, drying rabbits.. 183
Iphthimus opacus..... 27
Iridoprocne bicolor..... 150
Is it right to protect the female of the species at the cost of the male?..... 6
Ischnorrhynchos resedae. 29
Isia isabella..... 28
Isle Lake, Alta..... 154
Isohydocera tabida..... 28
Isopoda..... 105
Isopods, Land..... 105

Jack Miner's tagged wild geese visit another sanctuary..... 108
Jay, Black-headed..... 34
Blue..34, 35, 36, 37, 38, 149
Canada..34, 35, 38, 207
Labrador..... 33
Rocky Mountain... 70
Johansen, F., Crustacea 104
Echinoderms..... 187
Journey into the past (Review)..... 65
Junco.....36, 81, 83, 182
Oregon..... 107
Shufeldt's..... 34
Slate-coloured 35, 37, 150
Junco hyemalis.....83, 150

Kealy, L., Wasps..... 21

Killdeer..34, 63, 64, 74, 94, 96, 100, 129, 148, 180, 182, 183, 184, 203, 204
Kindle, C. H., "Ozarkian" Fauna..... 145
Kindle, E. D., Butterflies of Sudbury.... 134
Kindle, E. M., Reviews by.....65, 190
Kingbird..33, 129, 149, 153, 182, 205
Kingfisher, Belted....35, 37, 107, 149
Kinglet, Golden-crowned 34, 35, 36, 37, 151, 207
Ruby-crowned..37, 107, 151
Western..... 107
Kirkpatrick Lake, Alta. 202
Kittiwake..... 75
Koelz, W., Coregonid fishes of the Great Lakes (Review of).. 191

L., H., Review by..... 109
Labrador, Birds..11, 31, 52, 74
Labradorite..... 4
Lac La Biche, Alta..... 181
Lac La Nonne, Alta.... 154
Lac St. Anne, Alta..... 152
Lacuna porrecta..... 206
unifasciata..... 206
vincta..... 160
Lady, Painted..... 134
Lady's-slipper, Pink.... 98
Ram's Head.....96, 97
Smaller Yellow.... 98
Yellow..... 96
Lagopus lagopus albus.. 12
lagopus..... 12
ungava..... 12
rupestris atkensis... 14
islandorum.... 13
nelsoni..... 14
reinhardtii.... 13, 14
rupestris..... 13, 14
townsendii..... 14
welchi..... 14
Lamb's Quarters..... 102
Lanceley, A. & W. H., Red-headed Woodpecker..... 62
Land molluscs of the Abitibi region..... 104
Lanius ludovicianus migrans.....94, 150
Lapwing..... 78
Laqueus californicus vancouverensis..... 206
Large flock of Starlings 21
Lark..... 162
Desert Horned..71, 72, 129
Horned.....33, 35, 37
Prairie Horned..39, 94, 178
Shore..... 100
Larus argentatus..... 148
glaucescens....9, 10, 167
hyperboreus..... 75

Lasionycteris noctivagans 156
Lawrence, A. G., Migration of Mallards.... 42
Obituary of Harrold 132
Leda fossa..... 205
sculpta..... 206
vaginata..... 206
Leimonia labradorensis 33
Lemming, Labrador Banded.....17, 31
Lemnaceæ..... 72
Lepeta concentrica..... 206
Leptasterias littoralis.... 187
Leptoypha mutica..... 29
Leptura chrysocoma..... 27
luridipennis..... 28
nigrella..... 27
Lepus americanus.....81, 82
phæonotus..... 159
townsendii campanius..... 159
Lett, Norman H. H., G. R. White..... 103
Lewis, H. F., Letter from Starling at Petit Rocher..... 209
Ligyrocoris diffusus..... 42
Lilium philadelphicum andinum..... 29
Limestone, crystalline.. 180
Limnodromus griseus... 188
Limnoporus rufoscutellatus..... 78
Lindsay, R. W., Prothonotary Warbler.... 30
Listera cordata..... 164
Little Fish Lake, Alta... 98
Littorina litorea.....159, 202
palliata..... 160
rudis.....159, 160
Lloyd, H., Banded Gull Bird surgery..... 189
Lloyd, H., and Lett, N. H. H., G. R. White 167
Lloyd Lake, Alta..... 103
Lobelia..... 99
Longspur..... 180
Chestnut-collared..71, 72, 130, 178, 205
Lapland..36, 39, 53, 54, 131
McCown's..71, 72, 130, 205
Loon, Common..36, 74, 107, 129, 148, 162, 201
Pacific.....34, 107
Red-throated.....75, 107
Lopidea lathyri..... 29
Lora fidicula..... 206
Ludius appressa..... 27
hierglypticus..... 27
splendens..... 27
triundulatus..... 27
Lunda cirrhata..... 167
Lutra canadensis canadensis..... 156
Lycophalia occulta..... 28
Lygidea rubecula obscura 29
Lygus campestris..... 29
communis..... 29
oblineatus..... 29
omnivagus..... 29
Lygus pratensis..... 29
rubicundus winnipegensis..... 29
vanduzeei..... 29
vitticollis..... 29
Lynx.....157, 179, 181
Lynx canadensis canadensis..... 157
rufus rufus..... 157

Macoma balthica.....159, 160
brota..... 206
calcarea..... 206
incongrua..... 206
inquinata..... 206
nasuta..... 206
Madia glomerata.....106, 107
Magpie.....34, 35
Malacostraca..... 104
Malaxis brachypoda bifolia..... 99
unifolia bifolia..... 99
Mallard..37, 42, 72, 83, 101, 107, 129, 131, 153, 154, 155, 180, 181, 183, 185, 186, 200, 201, 202
Mallards tardy in migrating..... 42
Mallophaga.....14, 53, 54
Manawan Lake, Alta... 155
Manito Lake, Alta..... 100
Manual of external parasites (Review)..... 190
Many Island Lake, Alta. 70
Margarites pupillus..... 206
Marine molluscs collected by F. Johansen in the Maritime Provinces of Canada in the Autumn of 1926 159
Marion Lake, Alta..... 203
Marmota monax canadensis..... 157
Marten, Pine...156, 179, 181
Martes americana..... 156
Martin, Purple...98, 150, 185
Mason, W. F. H., Protection of Moose... 108
Mawdsley, J. B., Labradorite..... 4
Meadorus lateralis..... 29
Meadowlark.....36, 37, 107
Western....34, 101, 129, 130, 178, 181
Meadow-vole..... 36
Megalotomus 5-spinosus. 29
Melanerpes erythrocephalus..... 149
Melospiza lincolni lincolni..... 52
melodia.....96, 150
Members of Ottawa Field - Naturalists' Club and Subscribers to the Canadian Field - Naturalist May, 1929..... 110
Memoirs of the eighties 176
Menopon gonophæum... 34
striatum..... 14
Mephitis hudsonica..... 157
Mercury, Three-seeded. 20
Merganser..... 38
American.....36, 37
Hooded..... 107
Red-breasted....107, 148
Mergus serrator..... 148
Merlin, Richardson's... 204
Merriman, I., Towhee in February..... 167
Merriman, R. O., Birds of a suburban garden..... 51
Starlings..... 167
Metriona bicolor..... 27
Microcanthia humilis... 30
Microphylellus modestus. 29
Microsorex hoyi.....156, 168
Microsorex hoyi, a new mammal for the Toronto region..... 168
Microtus drummondii... 81
minor..... 158
pennsylvanicus drummondii..... 158
Migration of western plants to Toronto region..... 30
Mimus polyglottos..... 110
Miner, M. F., Mourning doves..... 20
Starlings..... 85
Tagged Geese..... 108
Three Geese..... 164
Mineralogy, Field-work in..... 135
Minerals, Heavy detrital 117
Ministik Lake, Alta.... 200
Mink.....179, 181
Hudson Bay..... 156
Mitchell, M. K. H., Birds of Miners Bay 147
Mittlenach Island..... 9, 10
Mniotilta varia.....96, 151
Mockingbird.....41, 110, 162
Mockingbird winters at Hamilton, Ont..... 41
Modiolus demissus....159, 160
modiolus..... 160
Mole, Brewer's..... 42
Molothrus ater ater..78, 96, 150
Monarch (butterfly).... 134
Moose.....159, 179, 181
Mose, Protection of.... 6, 59, 107
Moris bassana..... 78
Morrisonia vomerina.... 28
Moth, Clearwing..... 27
Mouse, Banded Pocket.. 15
Deer..... 36
Drummond's, Meadow..... 158
House.....158, 181
Hudsonian White-footed..... 17
Least Jumping..... 159
Least Meadow..... 158
Maximillian Grasshopper..... 158
Meadow Jumping.. 208
Northern Jumping. 158
Prairie Jumping.... 159
Prairie Red-backed. 158

Mouse:
White-footed 31, 158, 181
White-footed Deer..81, 82
Woodland Jumping... 208
Mousley, H., Notes on birds, etc..... 93
Mud Puppy..... 21
Munro, J. A., Black Squirrel..... 108
Sea birds in B.C.... 167
Western lakes and their bird-life....70, 99, 128, 152, 181, 200
Murre, California..... 107
Common..... 75
Mus musculus musculus 158
Muskrat.....82, 158, 181
Mustela cicognanii cicognanni..... 156
longicauda longicauda..... 156
rixosa rixosa..... 156
vison lacustris..... 156
Mya arenaria.....159, 160
intermedia..... 206
truncata.....160, 206
Myiarchus crinitus..... 149
Myiochanes virens..... 149
Myotis keenii septentrionalis..... 137
lucifugus lucifugus 137, 156
Mysis relicta..... 105
Mytilus edulis..159, 160, 205, 206

McCabe, T. T., and McCabe, E. B., Red-breasted Sapsucker 189
McIlwraith Ornithological Club, Annual Report 1928..... 83
MacLoghlin, Mrs. Anna E., Quotation from diary of..... 190
McMillan, G., Mockingbird..... 41

Nabis inscriptus..... 29
roseipennis..... 29
rufusculus..... 29
subcoleoptratus..... 29
Nannus hiemalis hiemalis 151
Natica clausa..... 206
janthostoma..... 206
National Museum, Fieldwork..... 134
Necturus maculosus..... 21
Neides muticus..... 29
Nematophyton..... 49
Neoborus amœnus..... 29
Neosorex..... 136
Neottiglossa undata..... 29
Neotoma.....101, 207
Nighthawk.....149, 181, 185
Nirmus alchata..... 14
Notes on a colony of Glaucous - winged Gulls in the Gulf of Georgia, B.C..... 9
Notes on a Devonian plant and other observations on a visit to Cross Point, Gaspé..... 47
Notes on the birds, orchids, ferns and butterflies of the Province of Quebec 93
Notes on the relation of temperature, hydrogen-ion concentration and oxygen, to the migration of adult sockeye salmon..... 1
Novel bird-banding note 39
Nucella lapillus.....159, 160
Nutcracker, Clark's.... 34
Nuthatch, Pygmy..... 34
Red-breasted..... 36
Slender-billed..... 34
White-breasted...35, 36, 37, 38, 39, 51, 151
Nuttallornis borealis..... 149
Nyctea nyctea.....32, 40
Nycteris borealis borealis 156
cinerea..... 156

Obituary:
Anderson, Col. W. P..... 64
Harrold, C. G..... 132
White, G. R..... 103
Occurrence of the European Starling at Petit Rocher, N.B. 42
Occurrence of the Great Grey Owl in the Montreal district... 40
Odocoileus hemionus hemionus..... 159
virginianus borealis. 159
Official Canadian Bird-banding Returns..42, 86, 138, 192
Old-squaw..... 36
On a new Pelecypod *Calyptogena gibbera* 93
On the question of "Is it right to protect the female of the species at the expense of the male?" 59
Oncometopia lateralis....27, 30
Odonata..... 202
Ondatra zibethica..... 82
cinnamomina.. 158
Oniscidae..... 105
Oniscus asellus..... 106
Onoclea struthipoteris... 98
Ontario, Birds..... 161
Onychomys leucogaster leucogaster..... 158
Ophioglossum vulgatum.. 99
Ophiopholis aculeata.... 187
Ophiozea robusta..... 187
Ophiuroidea..... 187
Opistheuria clandestina ventralis..... 29
Oporornis philadelphia..52, 97
Orchestia grillus..... 106
Orchids of Quebec..... 93
Orchis, Large Purple Fringed..... 98
Large Round-leaved 98
Showy.....97, 98
Small Northern Bog 98
SmallPurpleFringed 99
Orchis spectabilis.....97, 98
Oriole, Baltimore....97, 129, 150, 181, 185, 201, 205
Orthatylus dorsalis..... 29
flavosparsus..... 29
neglectus..... 29
Ortholomus scolopax..... 29
Osprey.....31, 149, 208
Ostrea virginica borealis 160
Otocoris alpestris praticola 94
alpestris..... 33
arcticola..... 33
hoyti..... 33
Ottawa Field Naturalists' Club Financial Standing..... 19
Report of Council.. 18
Reserve Fund..... 20
Otter.....156, 179, 181
Sea..... 208
Otus asio asio..... 149
Ouzel, Water..... 34
Ovenbird.....96, 97, 151
Owl..... 38
Barn..... 83
Barred.....36, 208
Burrowing..... 178
Great Gray..... 40
Great Horned....10, 34, 35, 36, 37, 51, 79, 108, 149, 160, 161, 206, 207, 208
Hawk.....94, 182
Labrador Horned... 32
Long-eared..37, 179, 180
Pygmy..... 107
Saw-whet.....149, 162
Screech..34, 35, 37, 50, 149
Short-eared... 31, 37, 38, 179, 180
Snowy....32, 35, 38, 40, 50, 161, 179, 180, 204
Western Horned... 180
Oxyechus vociferus.....94, 148
Oxyria digyna.....14, 54, 55
"Ozarkian" fauna from Jasper Park, Alberta..... 145

Pachysphin modesta.... 28
Pagasa fusca..... 29
Pakowki Lake, Alta.... 72
Palæmonetes paludosa... 104
Palæontology, Fieldwork in..... 136
Pamphila leonardus.... 28
Pandion haliaëtus carolinensis.....31, 149
Panomya ampla..... 206
Papaver nudicaule..... 53
Paphia staminea ruderata 206

Papilio glaucus 28
canadensis 97
polyxenes 97
turnus canadensis... 134
Paralellus subargentata.. 27
Parnassia palustris..... 180
Partridge 34, 162
Labrador Spruce... 12
Passer domesticus domesticus 150
Passerculus sandwichensis savanna 56
Passerina cyanea.....97, 150
nivalis nivalis..... 54
Patch, C. L., Review by 137
Pearse, T., Glaucous-winged gulls..... 9
Pediœcetes phasianellus. 83
Peewee, Wood.....149, 182
Pelecypoda.....93, 206
Pelican..100, 101, 102, 130 201
White 129
Pellæa gracilis 20
Pellets of hawks and owls are misleading..... 160
Pelthis angulalis 28
Penthestes atricapillus..40, 151
hudsonicus hudsonicus 57, 79
Perch 155
Perigenes constrictus.... 29
costalis 29
Perillus exaptus..... 29
Perisoreus canadensis nigricapillus..... 33
Perognathus fasciatus fasciatus..... 158
Peromyscus maniculatus. 17, 31, 32, 81, 82
maniculatus bawdri 158
Petrochelidon lunifrons.. 79
Phacoides acutilineatus.. 93
Phalacrocorax carbo..... 76
Phalarope, Northern.... 185
Wilson's....72, 73, 129, 130, 203
Pheasant..34, 35, 36, 37, 39, 107
Philaenus leucophtalmus 30
Phlepsius irroratus..... 30
Phlœotomus pileatus abieticola..... 149
Phoebe 149
Photinus ardens..... 28
Photuris pennsylvanica.. 28
Phragmatobia, fuliginosus..... 28
Phyciodes nycteis..... 28
tharos.....28, 134
Physatocheila plexa..... 29
Phytocoris eximius..... 29
lasiomeris..... 29
salicis..... 29
Pickerel 155
Pieris rapæ.....28, 149, 173
Pigeon Lake, Alta..... 183
Pigeon, Passenger..... 180
Piggott, J. W., Swallows' nests..... 168
Pike..... 155
Pileated Woodpecker... 61
Pinicola enucleator leucura..... 166
Pintail....72, 73, 83, 100, 101, 131, 183, 184, 185, 200, 202
Pipilo erythrophthalmus erythrophthalmus... 150
Pipit..... 96
American..... 178
Sprague's..130, 204, 205
Piranga erythromelas...97, 150
Plagiognathus alboradialis..... 30
fraternus..... 30
obscurus..... 30
politus..... 30
pallidicornis... 30
Planesticus migratorius 83, 94, 152, 166
Plebeius sæpiolus..... 134
Pleistocene Fauna from British Columbia... 205
Plethodon intermedius... 138
Plover, American Golden 11
Black-bellied...131, 183, 185, 203, 204
Golden....131, 178, 180
Semipalmated.....11, 63
Upland....100, 178, 180
Poa alpina..... 53
Poanes hobomok..... 134
zabulon..... 28
Podisus maculiventris... 29
modestus..... 29
serieventris..... 29
Pododesmus macrochisma..... 206
Poecilocaposus lineatus.. 29
Polia adjuncta..... 28
Polites peckius..... 134
Polygonia faunus..... 134
progne..... 27
Polygonum viviparum..14, 53, 54, 55
Polymeris proxima..... 29
Polystichum Lonchitis... 20
Pontoporeia affinis..... 105
filicornis..... 105
hoyi..... 105
Pooecetes gramineus gramineus.....52, 150
Porcellio rathkei..... 106
scaber..... 106
Porcupine.....179, 181, 208
Potomogeton pectinatus 130, 200
perfoliatus..... 130
Prairie-chicken...35, 178, 180
Prawn, Freshwater..... 104
Procyon lotor lotor..... 156
Progne subis.....98, 150
Protection of Moose.... 107
Protenor belfragei..... 29
Protonotaria citrea..... 164
Prototaxites..... 49
Psallus alnicenatus..... 29
Psilophyton..... 49
Psolus fabricii..... 187
Psoralia escuenta..... 177
Ptarmigan, Rock..... 13
Willow..... 12
Puffin, Atlantic..... 75
Tufted..... 167
Punctiurella galeata..... 206
Purple, Banded..... 134
Pyractomena lucifer..... 28
Pyrameis cardui..... 134
Pyramidula cronkhitei anthonyi..... 104
catskillensis ... 104
Pytho planus..... 28

Quail....34, 37, 160, 161, 162, 207
California..... 107
Quebec, Birds..... 93
Butterflies..... 93
Ferns..... 93
Orchids..... 93
Quill Lake, Sask..... 129
Quiscalus quiscula..... 79
aeneus.....96, 150

Rabbit..... 82
Bush..... 159
Cotton-tail..... 159
Jack.....159, 181
Snowshoe.....81, 159, 177, 181
Rabbits, drying..... 183
Raccoon.....156, 179, 181
Ragweed..... 20
Western..... 137
Rail, Sora...82, 83, 178, 180
Rainy River insects.... 27
Rana aurora aurora..... 138
cantabrigensis..... 138
pretiosa..... 138
Random notes on the fluctuation in numbers of rodents and grouse in Canada.. 162
Random notes on the insects of the Rainy River district..... 27
Raphistoma.....146, 147
Rat, House.....82, 158, 181
Rattus norvegicus...81, 82, 158
Raven..... 107
Northern.....31, 34
Red Deer Lake, Alta... 184
Redberry Lake, Sask... 128
Redhead.....72, 100, 130
Red-headed Woodpecker in Ottawa..... 62
Redpoll....34, 35, 36, 38, 51, 150
Greater..... 53
Greenland..... 54
Labrador..... 53
Redstart.....151, 153, 172
American..... 56
Redwing, Thick-billed 129, 204
Regulus calendula calendula..... 151
satrapa satrapa.... 151
Re-mating of Red-breasted Sapsucker..... 189
Report fo Council for 1928..... 18
Ringlet, Plain..... 134
Riparia riparia..... 150
Rissa tridactyla..... 75

Robin....35, 36, 37, 38, 39, 51, 83, 84, 94, 152, 162, 166, 181, 182, 186, 201
Rocky Mountains..... 23
Rodents, Fluctuation of 162
Rubicola minor....93, 94, 95
Rutile..... 120
Rutter, R. J., Cardinal at Toronto..... 188
Grasshopper Sparrow..... 166
Great Horned Owl 108
Robin..... 84

Sabulodes transversata.. 28
Sage Grouse in Saskatchewan..... 197
Salamander, Spotted..82, 83
Tiger..... 179
Salda coriacea..... 30
Salmon, Migration of.. 1
Sockeye..... 1
Salsola Kali tenuifolia.. 30
Salvelinus fontinalis.... 105
Sampson Lake, Alta.... 184
Sanderling..... 107
Sandpiper, Aleutian.... 107
Baird's....63, 131, 155, 201, 205, 208
Bartram's..73, 85, 100, 208
Least.....63, 185, 201
Pectoral..74, 131, 155, 204
Purple..... 78
Red-backed.....63, 107
Semi-palmated..63, 201, 205
Solitary..148, 185, 201, 204
Spotted....64, 100, 129, 148, 181
Stilt..... 185
White-rumped..... 32
Saperda calcarata..... 28
Sapsucker, Red-breasted 189
Williamson's..... 70
Yellow-bellied..149, 185, 201
Satyrus alope nephele... 134
Satyrodes canthus..... 134
Saunders, W. E., Brewer's Mole..... 42
Dowitcher..... 208
Evening Grosbeak. 190
Smoky Shrew..... 42
Visit to Flowerpot Island..... 20
Water Shrew..... 108
White-lipped Shrew 207
Sawfly, Wheat-stem.... 180
Saxicava arctica..... 206
pholadis..... 206
Saxicola oenanthe leucorhoa..... 57
Saxidomus giganteus.... 206
Saxifraga cæspitosa groenlandica.....53, 54, 55
Sayornis phœbe..... 149
Scaphiopus hammondii.. 138
Schierbeck, O., Game protection..... 6
Schizopoda..... 105
Schizothaerus capax..... 206
Scientific natural history, Review..... 22
Sciurus hudsonicus....83, 157
Scolopostethus thomsoni.. 29
Scoter, American..... 107
Surf..... 107
White-winged..100, 101, 107, 129, 184, 185, 201
Scotiaptex nebulosa..... 40
Scutellaria..... 180
Sea Otter increasing.... 208
Sedimentary record in the Rocky Mountains at about the 51st parallel..... 23
Sciurus aurocapillus...96, 151
noveboracensis..94, 96, 151
Semi-precious labradorite in Canada..... 4
Serpula..... 206
Serripes grönlandicus... 206
Setophaga ruticilla.....56, 151
Shooting Lake, Alta.... 203
Shoveller..72, 100, 101, 129, 131, 180, 200, 202
Shrew, Hayden..... 155
Long-tailed..... 205
Pigmy.....156, 168
Saddle-backed..... 156
Short-tailed..... 82
Smoky..... 42
Southern Saddle-backed..... 156
Water..108, 136, 156, 208
White-lipped..... 207
Shrike, Loggerhead..... 39
Migrant.....94, 150
Northern..34, 35, 36, 38, 39, 51
White-rumped 129, 181, 182
Sialia sialis sialis..... 152
Sickman Lake, Alta.... 201
Silver-spot, Mountain.. 134
Simpson, H. M., Deaths of Coots..... 166
Sinea diadema..... 29
Siskin, Pine..35, 36, 37, 150, 182, 200
Sitta carolinensis carolinensis..... 151
Skipper..... 28
Hobomok..... 134
Peck's..... 134
Silver-spotted....97, 134
Skunk.....179, 181
Broad-striped..... 157
Small, H. B., Col. W. P. Anderson..... 64
Smerinthus janaciensis.. 28
Smith, N., Chickadee-Grouse alliance.... 39
Great Grey Owl... 40
Smoky Shrew at London, Ont..... 42
Snake, Garter..... 180
Grass..... 10
Green..... 180
Hog..... 180
Red-bellied..... 180
Snipe, Wilson's..95, 148, 155, 178, 180, 185
Snowflake.....38, 39
Snyder, L. L., Crow measurements..... 41
Florida Gallinule... 165
Holboell's Grebe... 166
Soaring flight of birds. 165
Soldula interstitialis.... 30
major..... 30
Somateria mollissima... 172
spectabilis..... 172
Some Amphibians of Western North America (Review)..... 137
Some heavy detrital minerals in Canadian sediments.... 117
Some little brown bats from Ontario..... 137
Some measurements of the Common Crow 41
Song of the Robin.... 84
Sorex arcticus arcticus.. 156
laricorum..... 158
cinereus haydeni.... 155
palustris palustris 136, 156
albibarbis..... 136
gloveralleni...136, 137
hydrobadistes.136, 137
navigator..... 136
palustris..... 136
Sounding Lake, Alta... 203
Sowthistle..... 180
Sparrow.....81, 83
Baird's 101, 129, 204, 205
Chipping.....150, 153
Clay-coloured..... 205
Dakota Song..... 129
Fox.....38, 39
Grasshopper..... 166
House..28, 34, 35, 36, 37, 38, 51, 107, 150, 181, 182, 185
Lincoln's.....52, 153
Nelson's..... 131
Rusty Song..... 107
Savannah..51, 56, 100, 101, 129, 130, 131, 153, 182
Song....34, 35, 36, 37, 96, 150, 201
Sooty Fox..... 107
Swamp.....52, 153
Tree....34, 35, 36, 37, 38, 39, 52
Vesper....51, 52, 101, 129, 150, 178, 182, 185
White-crowned.... 56
White-throated..36, 37, 96, 150, 153, 207
Sphene..... 120
Sphinx (caterpillar).... 177
Sphinx kalmiæ..... 28
Sphragisticus nebulosus 29
Sphyrapicus ruber..... 189
varius varius..... 149
Spinus pinus..... 150
Spirorbis..... 206
Spisula similis.....159, 160
voyi..... 206
Spizella monticola..... 83
passerina passerina. 150
Spot, Crescent..... 28

Spread of the Black Squirrel in the Toronto region and Victoria County, Ontario 108
Spread of the European Starling 84
Spring Excursions 85
Squires, S. K., Barn Swallows 59
Pileated Woodpecker 61
Starlings 189
Towhee 84
Squirrel, Black 108
Columbian Ground 70
Franklin's Ground, 82, 157
Northern Flying 208
Pale Flying 158
Prairie Ground 70
Red 83, 157
Richardson's Ground 102, 157
13-striped Ground, 82, 182
Stachys palustris 180
Starling, European 21, 35, 36, 37, 38, 39, 42, 51, 52, 84, 85, 167, 189
Starlings at a feeding station 167
Starlings at Miner bird sanctuary 85
Starlings in Fredericton, N.B. 189
Statement of the financial standing of the Ottawa Field-Naturalists' Club at the close of the year 1927-28 19
Statement reserve fund committee 20
Status of Sea-birds on Bare Island, B.C., 1927 167
Stellaria cerastoides 53, 54, 55
Stenodema trispinosum 29
vicinum 29
Stenotus binotatus 29
Sterna paradisæa 76
Strangalepta pubera 27
Strongylocentrotus droebachiensis 187, 206
Strongylocoria stygicus 29
Sturnella magna magna 150
Sturnus vulgaris 42, 52, 84, 167
Succinea avara 104
ovalis 104
retusa 104
Substantiation of the winter record of the Florida Gallinule, Toronto 165
Sullivan Lake, Alta 204
Sulphur, Pink-edged 134
Sumas River 2
Summer birds of Miners Bay and vicinity, Haliburton County, Ontario 147
Surnia ulula 94
Swallow, Bank 150
Barn 59, 150, 168, 181
Cliff 79, 168
Tree 150
Swallows' Nests 168
Swallowtail 28
Black 97
Tiger 97, 134
Swan 162
Swift, Chimney 78, 149
Sylvan Lake, Alta 184
Sylvilagus floridanus similis 157
Symphysurina walcotti 146, 147
Syntrophia convexa 146, 147

Tachyta nana 28
Talitrus saltator 12
Tamias striatus griseus 157
Tanager, Scarlet 97
Western 200
Taraxacum erythrocarpus 180
Tar-weed 30, 106, 107
Taverner, P. A., Fluctuation of grouse and rodents 162
Labrador Birds 74
Taxidea taxus taxus 157
Teal, Blue-winged 72, 131, 180, 185, 200, 201
Green-winged 35, 107, 131, 180
Telea polyphemus 28
Telemona pyramidata 30
reclivata 30
Tellinomya nasuta 66
Terebratalia transversa caurina 206
Tern 100
Arctic 76
Black 63, 72, 129, 180, 182, 201
Common 72, 129, 184, 185, 201, 202, 204
Terrill, L. M., Brown Creeper 50
Tetracis crocallata 28
Thanaos brizo 28
Thistle, Canada 180
Russian 30
Thomomys talpoides 81, 82
rufescens 158
Thompson, Stuart L., Blue-gray Gnatcatcher 85
Plant migration 30
Thrasher, Brown 151, 162
Three of Jack Miner's tagged Geese killed by one man 164
Thrush, Grinnell's Water 204
Hermit 152, 186
Northern Water 207
Olive-backed 152
Varied 204
Water 94, 96, 151
Willow 101
Wood 151
Thyasira gouldii 206
Thyreocoris anthracinus 28
ater 28
lateralis 29
pulicarius 29
Tilia americana 188
Titanite 120
Titlark 178
Titmouse, Tufted 52
Toad 179
Tortoise, Compton (butterfly) 134
Tortoise-shell, Milbert's 134
Tostonia iole 146, 147
Totanus flavipes 78
melanoleucus 78, 96
Tourmaline 123
Towhee 84, 150, 167
Oregon 107
Towhee at Toronto in February 167
Towhee in Fredericton, N.B. 84
Toxostoma rufum 151
Trichiatinus affinio 27
Trichotropis cancellata 205
quadri-carinata 206
Trigonotylus ruficornis 29
Trilobita 146, 147
Tringa solitaria solitaria 148
Triphleps insidiosus 29
tristicolor 29
Tritia trivittata 159, 160
Triturus torosus 138
Troglodytes ædon ædon 151
Trout, Brook 105
Tryp ta solidaginis 28
Tuberculosis in Crows 107
Tufts, R. W., Chickadees in Tanglefoot 189
Turkey, Wild 161
Turnip, Cree 177
Turnstone 12
Black 107
Ruddy 12
Twayblade, Heart-leaved 98
Tyrannus tyrannus 33, 149

Uria troille 75

Vanellus vanellus 78
Veery 151
Venus mercenaria 160
Vermes 171, 206
Vermivora celata 79
peregrina 52
Vertebrate Zoology, Review of 21
Vertigo ovata 104
Viceroy 97
Vicia 180
Viola conspersa 180
rotundifolia 96
Violet, Round-leaved 96
Vireo, Philadelphia 52, 79
Red-eyed 150
Warbling 151, 153
Western Warbling 129

Vireosylva gilva gilva.... 151
olivacea..... 150
philadelphica.....52, 79
Virtue, R., Mockingbird 110
Visit to Flowerpot Island..... 20
Vitrea binneyana..... 104
hammonis..... 104
Vitrina limpida..... 104
Vole..... 158
Drummond's.....81, 82
Red-backed.....81, 82
Vulpes lagopus..... 16
regalis..... 157
Vulture, Turkey..... 200

Wabuman Lake, Alta... 152
Wanison Lake, Alta.... 187
Wanted—Crows—Dead or Alive..... 107
Wapiti.....97, 159
Warbler, Bay-breasted, 52, 79, 151
Black and White..96, 151, 201
Blackburnian..... 172
Black-capped..... 208
Black-poll.....52, 97
Black-throated Blue Green....52, 151, 201
Canadian.....79, 151
Cape May.....52, 208
Cerulean..... 21
Chestnut-sided.... 151
Magnolia..... 151
Mourning..52, 97, 98, 207
Myrtle.....151, 186
Northern Parula... 52
Orange-crowned... 79
Pine..... 97
Prothonotary..... 164
Tennessee..52, 153, 201, 205
Wilson's..... 52
Yellow..97, 151, 153, 201
Warren, P. S., Sedimentary record..... 23
Wasps occupy a House Wren box..... 21
Water Shrew at Scotia Junction, Ont..... 108
Water Shrew in Ontraio 136
Water-thrush..... 52
Wavy Lake, Alta..... 185
Waxwing, Bohemian....34, 35
Cedar..37, 100, 129, 150, 201
Weasel..... 179
Bonaparte's.....156, 181
Least.....156, 181
Long-tailed.....156, 181
Western Ragweed farther east..... 137
What surgeon to the birds treated this Pine Grosbeak?..... 167
Wheatear, Greenland... 57
Whip-poor-will..149, 162, 181
White, G. R., Obituary 103
White, Lt.-Col. William 69
White-fish..... 155
Whitford Lake, Alta.... 181
Who banded this Gull? 189
Widgeon..... 107
European..... 137
Willet, Western..72, 100, 101, 129, 130, 131, 183, 202, 204
Willey, A., Review by.. 21
William Couper—a pioneer Canadian naturalist..... 169
Wilsonia canadensis...79, 151
Wizard Lake, Alta..... 186
Wolf, Buffalo.....179, 181
Timber..... 157
Wolverine.....179, 181
Wood, fossil..... 47
Woodchuck..... 157
Woodcock.....93, 94, 95
Wood-nymph, Clouded. 134
Woodpecker, American
Three-toed..... 34
Arctic Three-toed.34, 149
Batchelder..... 34
Black-backed..... 208
Downy..34, 35, 36, 37, 38, 39, 51, 108, 153, 205
Gairdner's..... 107
Hairy..34, 35, 36, 37, 38, 51, 149, 200
Harriss's..... 107
Lewis'.....34, 70, 204
Northern Pileated.. 149
Woodpecker:
Pileated, 34, 61, 107, 207
Red-headed.....62, 149
Swain's..... 149
Woodwardia..... 208
Worm, Canker..... 189
Wren, House..151, 181, 182, 185
Marsh..... 72
Prairie Marsh..... 131
Seattle..... 107
Winter..34, 37, 52, 107, 151

Xanthia lutea..... 28
Xenoborus commesuralis 29
plagifer..... 29
Xylocoris cursitans..... 29

Yellowhead..... 155
Yellowlegs..... 208
Greater..78, 96, 180, 184, 185, 202, 204
Lesser..63, 78, 100, 130, 155, 183, 185, 201, 203, 204
Yellow-throat, Maryland 62, 101, 151

Zapus hudsonius campestris..... 159
hudsonius..... 158
princeps minor..... 159
Zelus socius..... 29
Zenaidura macroura.... 52
Zircon..... 120
Zizia aurea..... 180
Zonitoides arboreus..... 104
exigus..... 104
Zonatrichia albicollis...96, 150
leucophrys leucophrys..... 56
Zoology, Field-work in. 135

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